

EFKA vario dc

CONTROL

JU82BV3305

with control panel V810/V820

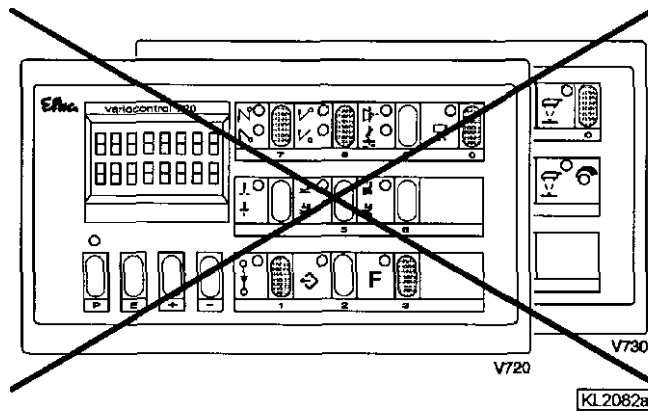
INSTRUCTION MANUAL

No. 0402231

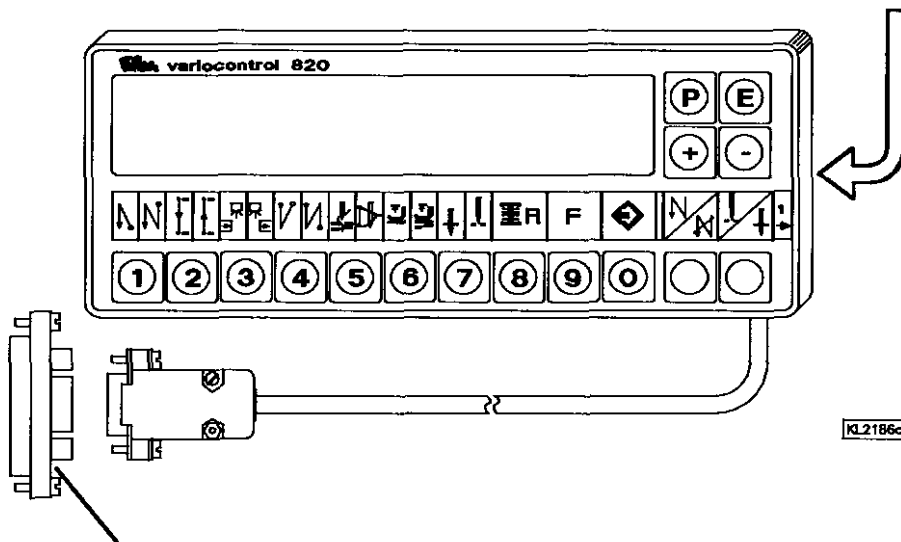
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ATTENTION - NEW CONTROL PANELS!

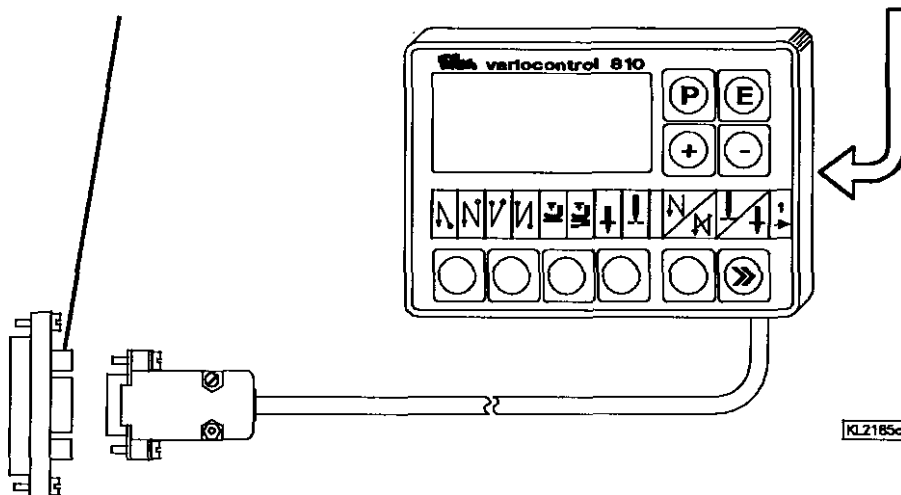
Old - V720, V730 are not functional on JU82BV3305!



New - V810, V820



Adapter No. 0504539



Efka vario dc

CONTROL

JU82BV3225

INSTRUCTION MANUAL

No. 0402090

english

Efka
FRANKL & KIRCHNER
GMBH & CO KG

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EFKA OF AMERICA INC.

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EFKA ELECTRONIC MOTORS
SINGAPORE PTE. LTD.

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Operating elements of the Variocontrol

see table on the last page

Parameter list - see separate brochure

1. Important Safety Instructions

When using an EFKA drive and accompanying appliances (e.g. for sewing machines), basic safety precautions should always be followed, including the following:

- Read all instructions thoroughly before using this drive.
- Drive and accompanying appliances should be mounted and put into operation by qualified personnel in accordance with the guidelines provided in the instruction manual.

To reduce the risk of burns, fire, electric shock, or personal injury:

- Use this drive only for its intended use as described in the instruction manual.
- Use only attachments recommended by the manufacturer or as contained in the instruction manual.
- Do not operate without corresponding protective devices.
- Never operate this drive if one or more parts (e.g. cables, plugs) are damaged, if it is not working properly, if any damages can be identified or are to be suspected (e.g. after it has been dropped). Only qualified personnel are authorized to make adjustments, eliminate faults and complete repair work.
- Never operate the drive with the air openings blocked. Keep ventilation openings of the drive free from the accumulation of lint, dust and loose cloth.
- Never drop or insert any object into any opening.
- Do not use drive outdoors.
- Do not operate where aerosol (spray) products are being used or where oxygen is being administered.
- To disconnect, turn off main switch, then remove plug from outlet.
- Do not unplug by pulling on cord. To unplug, grasp the plug, not the cord.
- Keep fingers away from all moving machine parts. Special care is required e.g. around the sewing machine needle and the V-belt.
- Before mounting and adjusting accompanying appliances, i.e. positioner, reversing device, light barrier, etc., disconnect drive from mains (turn off main switch, remove mains plug from outlet (DIN VDE 0113 part 301; EN 60204-3-1; IEC 204-3-1)).
- Always switch off (0) machine and remove plug from outlet, when removing covers, mounting accompanying appliances, position transmitter especially, light barrier, etc., or any other devices mentioned in the instruction manual.
- Only qualified personnel are authorized to work on the electrical components.

- Work on high voltage circuit areas is forbidden, except as stated in the respective regulations, e.g. DIN VDE 0105 part 1.
- Only specially trained personnel are authorized to complete repair work.
- Cables to be wired must be protected against expectable strain and fastened adequately.
- Cables near moving machine parts (e.g. V-belts) must be wired at a minimum distance of 25 mm (see DIN VDE 0113 part 301; EN 60204-3-1; IEC 204-3-1).
- For safety it is preferred to wire the cables separately from each other.
- Before connecting the mains line make sure that the mains voltage corresponds to the specifications on the motor rating plate and on the nameplate of the power pack.
- Connect this drive to a properly grounded outlet only. See Grounding Instructions.
- Electric accompanying appliances and accessories must only be connected to safety low voltage.
- EFKA DC drives are protected according to overvoltage class 2 (DIN VDE 0160 § 5.3.1).
- Observe all safety guidelines before undertaking conversions or modifications.
- For repair and maintenance use only original replacement parts.



Warnings in the instruction manual which point out particular risks of personal injury or risk to the machine are marked with this symbol wherever applicable.



This symbol is a warning on the control and in the instruction manual. It indicates hazardous voltage.

CAUTION - In the case of failure this area can be current-carrying even after having turned the power off (non discharged capacitors).

- The drive is not an independently operating unit, but is designed to be incorporated into other machinery. It must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the EC Directive.

Save these instructions for future reference.

2. Range of Applications

The drive is suitable for sewing machines: Juki

Brand	Series
Juki	LU-2210-6

2.1 Use in Accordance with Regulations

The drive is not an independently operative machine, but it is designed for being built into other machines. It can only be put into operation after it has been certified that the machine to which it will be attached meets the specifications of the EC Directive (Appendix II, paragraph B of the Directive 89/392//392/EWG and supplement 91/368/EWG).

The drive has been developed and manufactured in accordance with the respective EC standards:

EN 60204-3-1:1990 Electric equipment of industrial machines:
special requirements for industrial sewing machines,
sewing units and sewing systems.

The drive can only be operated:

- on thread processing machines
- in dry areas

3. Complete Drive Unit Consisting of

1	Direct current motor	DC....
1	Control	vario dc JU82BV3225
	- Power pack	N152 (optional N153, N155)
	- External actuator	EB301 (optional EB302, softer springs)
1	Control panel Variocontrol	V720, V730 oder V740 *1)
1	Position transmitter	P6-1
1	Mains switch	NS105
1	Set of standard accessories	B131
	consisting of:	belt guard complete set of hardware motor foot bracket 1 and 2, short documentation
1	Pulley	58 mm (nominal size)

*1) Light barrier control possible by using:

- V720 - Reflection light barrier module LSM001
- V730 - Reflection light barrier LS-001-004 or reflection light barrier module LSM001
- V740 - Transmitted light barrier Varioply or reflection light barrier module LSM001

3.1 Special Accessories

Storage unit Memory Box MB001	- part no. 7900052
Storage card Memory Card MC001	- part no. 1111602
Reflection light barrier module Variolux LSM001	- part no. 6100028
Reflection light barrier Variolux LS-001-004	- part no. 6100007
Transmitted light barrier Varioply - transmitter DLS-001	- part no. 6100027
- receiver DLL-...	- available versions see specification Varioply
Solenoid type EM1..(for e.g. presser foot lifting, backtacking, etc.)	- available versions see specification solenoids
Extension cable for external actuator, approx. 750 mm long, complete with plug and socket connector	- part no. 1111845
Extension cable for external actuator, approx. 1500 mm long, complete with plug and socket connector	- part no. 1111787
5-pin plug with slide index for the connection of another external control	- part no. 0501278
Foot control type FB302 for standing operation with approx. 1400 mm connecting cable and plug	- part no. 4160018
Potential equalization cord 700 mm long, LIY 2.5 mm ² , grey, with forked cable brackets on both sides	- part no. 1100313
Extension cable for position transmitter P6-., approx. 1100 mm long, complete with plug and socket connector	- part no. 1100409
Extension cable for commutation transmitter, approx. 315 mm long, complete with plug and socket connector	- part no. 1111229
Extension cable for commutation transmitter, approx. 1100 mm long, complete with plug and socket connector	- part no. 1111584
Extension cable for motor connection, approx. 400 mm long	- part no. 1111858
Extension cable for motor connection, approx. 1500 mm long	- part no. 1111857
Pulley 40 mm ϕ with special belt intake and slip-off protection (use SPZ belt)	- part no. 1112223
Pulley 50 mm ϕ with special belt intake and slip-off protection (use SPZ belt)	- part no. 1112224
Knee switch type KN3 (pushbutton) with cord of approx. 950 mm length without plug	- part no. 58.0013
Sewing light transformer	- please indicate line voltage and sewing light voltage (6.3V or 12V)
3-pin plug with slide index	- part no. 0500402
5-pin plug with slide index	- part no. 0501278
6-pin plug with slide index	- part no. 0500703
7-pin plug with slide index	- part no. 0502474
6-pin plug (Hirschmann Mes60)	- part no. 0500457
10-pin plug (Hirschmann Mes100)	- part no. 0500357

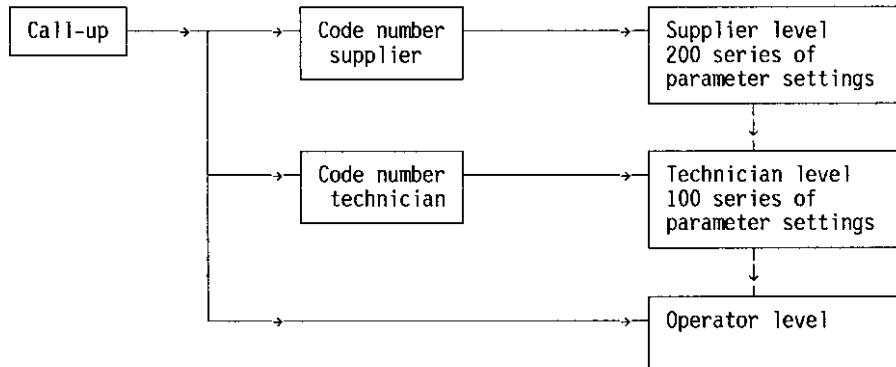
4. Operation

4.1 Access to Programming on Command Input

In order to prevent the unintentional modification of preset functions the input commands are distributed at various levels.

The following persons have access:

- the supplier to the highest and all subordinate levels by a code number
- the technician to the next lower and all subordinate levels by a code number
- the operator to the lowest level without code number



4.2 Code Number Input

1. TURN POWER OFF

2. -> P + TURN POWER ON ==> C-0000

3. -> 1 -> 2 -> 3 ->.. Input CODE NUMBER !
(Example)

4. -> E -> If CODE NUMBER wrong repeat input ! ==> C-0000
InFo F1

-> If CODE NUMBER correct ==> F-XXX

F-XXX = first parameter number in the recalled level

4.3 Direct Operation

By pushing the numeral buttons and some symbol buttons on the Variocontrol it is possible to turn functions on or off.

Example start backtack: - Double start backtack is on	top LED7 lights up	I <input type="text" value="7"/>
		0
Push button 7 briefly - Start backtack is off	both LED7 off	0 <input type="text" value="7"/>
		0
Push button 7 briefly - Single start backtack is on	bottom LED7 lights up	I <input type="text" value="7"/>

4.4 Input by Parameters on the Operator Level

>> ONLY If CODE NUMBER WAS NOT INPUT <<

1. -> ==> LED pushbutton P blinks ! ==>

2. -> -> Display of the first parameter ==>
parameter no. does not appear !

aaa = abbreviation of the parameter
bbb = value of the parameter

3. -> -> -> Change parameter value !

4. -> -> PARAMETER VALUE is entered ==>
Display steps to next PARAMETER

OR

-> -> PARAMETER VALUE is entered !

==>

4.5 Input by Parameters on the Technician and Supplier Level

-> After input of the CODE NUMBER ==> F-XXX
 Display of the first PARAMETER NO.

-> On with step 3 ! <-
 -> Call-up after termination of a seam !

1. -> P ==> The most significant digit ==> F-XXX
 on the display blinks!

2. -> 1 -> 2 -> 3 ->.. Input desired PARAMETER NO.
 (Example)

3. -> E -> If PARAMETER NUMBER wrong ==> F-XXX
InFo F1
 repeat input !

-> If PARAMETER NUMBER correct ==> F-XXX
aaa bbb

F-XXX = recalled parameter number
 aaa = abbreviation of the parameter
 bbb = value of the parameter

4. -> + -> - -> Change parameter value !

5. -> E -> PARAMETER VALUE is entered ==> F-XXX
aaa bbb
 Display steps to next PARAMETER

OR

-> P -> PARAMETER VALUE is entered ==> F-XXX
 Call-up of a new PARAMETER NO.
 as under step 1 possible !

OR

-> P -> P -> Press button ==> EXIT PROGRAMMING !
 twice

5. Operating the Motor

5.1 General Instructions

When putting the control into operation, the programming is changed in the following manner:

Adjust the direction of rotation of the motor, parameter F-161

If necessary, adjust the reference position, parameter F-170

If necessary, adjust the positions, parameter F-171

If necessary, adjust the speeds, parameters F-110...F-118

If necessary, adjust the remaining relevant parameters

Start sewing in order to save the adjusted values

- If the power was turned off the adjustments made before starting to sew get lost.

Note:

If the direction of rotation of the motor is changed the positions must be reprogrammed.

5.2 Initial Operation (New Motor)

The instructions for initial operation are valid under the following conditions only:

- The positions must not have been reprogrammed.
- The *direction of rotation of the motor shaft must be set to "anticlockwise rotation".*

Before mounting the position transmitter the sewing machine shaft is to be set to the reference position.

Note:

Reference position = needle point at the height of the needle plate, from downward movement of the needle in the direction of rotation of the motor shaft.

Markings on the position transmitter shaft and on the position transmitter housing have to be aligned, then mount the position transmitter on the sewing machine shaft.

If necessary, adjust the speeds, parameter F-110...F-118.

If necessary, adjust the remaining relevant parameters.

Start sewing in order to save the adjusted values.

- If the power was turned off the adjustments made before starting to sew get lost.

6. Aids for Putting into Operation and for Setting

6.1 Fast Installation Routine (SIR)

SIR offers the possibility to set the most important settings for initial operation by using the menu.

For safety reasons, all selections on the menu must be addressed. Only then, correct setting of all parameters is guaranteed!

The normal parameter settings are not affected.

6.1.1 Putting into Operation by Using SIR

Example:

1. -> + TURN POWER ON ==>
2. -> -> Call-up of the possible languages (actual language blinks) ==>
3. -> -> Select the desired language ==>
4. -> -> **Set the reference position.** Turn position transmitter at least until the marker ([) has disappeared. ==>

Note:

Reference position = needle point at the height of the needle plate, from downward movement of the needle in the direction of rotation of the motor shaft.

5. Set position 1

- > -> Turn position transmitter to the desired position. ==>

Adjust positions by turning the handwheel until the desired position is reached, but at least until the action has been completed on the display.

or

- > -> -> Set the increments (2 increments correspond to approx. 1.4 °)

6. Set position 2

- > -> Turn position transmitter to the desired position. ==>

or

- > -> -> Set the increments (2 increments correspond to approx. 1.4 °)

7. Set position 1A

-> -> Turn position transmitter to the desired position. ==>

PoSition
1A 086

or

-> -> -> Set the increments
(2 increments correspond to approx. 1.4 °)

8. Set position 2A

-> -> Turn position transmitter to the desired position. ==>

PoSition
2A 460

or

-> -> -> Set the increments
(2 increments correspond to approx. 1.4 °)

9. -> -> Set the positioning speed ==>

Lo SPEEd
n1 0170

-> -> -> Change value

10.-> -> Set the maximum speed ==>

hi SPEEd
n2 3500

-> -> -> Change value

11.-> -> Set the direction of rotation ==>

rotAtion
drE 1

-> -> -> Change value

12.-> -> Entry into normal operation after POWER ON. ==>

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6.1.2 Multilingual Display

dEU USA ESP FrA		Language selection			
dEU	USA	ESP	FrA		
PoSition 0]	PoSition 0]	PoSicion 0]	PoSition 0]	Reference position	
PoSition 1 046	PoSition 1 046	PoSicion 1 046	PoSition 1 046	Position 1 leading	
PoSition 2 270	PoSition 2 270	PoSicion 2 270	PoSition 2 270	Position 2 leading	
PoSition 1A 086	PoSition 1A 086	PoSicion 1A 086	PoSition 1A 086	Position 1A trailing	
PoSition 2A 460	PoSition 2A 460	PoSicion 2A 460	PoSition 2A 460	Position 2A trailing	
niEdriG n1 0170	Lo SPEEd n1 0170	vEL bAJA n1 0170	vit LEnt 2A 0170	Positioning speed	
hoch n2^ 3500	hi SPEEd n2^ 3500	vEL ALtA n2^ 3500	vit rAPi n2^ 3500	Maximum speed	
drEhri drE 1	rotAtion drE 1	rotAcion drE 1	rotAtion drE 1	Direction of rotation	

6.2 Direct Input of Speed (DED)

Maximum speed (upper limit of the function DED) --> F-111
Lower limit of the function DED --> F-121

With the help of this function, the maximum speed can be changed easily from the Variocontrol without going into programming mode.

Display in the direct mode:

4300	==> Display of speed n-max
xx82xV	==> Type of control

The maximum speed n-max can be changed directly by pushbuttons +/- on the front of the Variocontrol outside of the sewing cycle. The speed will be indicated on the display. The upper limit of n-max is determined by parameter

F-111 in the programming mode. The lower limit is determined by parameter F-121.

As usual, saving the value is done by the next sewing start.

6.3 Pushbuttons for Background Information (HIT)

(see table on the last page)

For fast operator information the values of the functions are indicated on the display of the Variocontrol for approx. 3 seconds by pressing the pushbuttons 1, 3 7, 8 and 0, when switching on. During this time the respective value can be changed immediately by the pushbuttons + and -. The display remains the same during set-up.

If the value of an activated function is to be changed the respective function key must be pressed somewhat longer. The function will then be returned to its original setting. Subsequently, the function with the respective value is shown on the display again.

6.3.1 Examples for HIT

Increase stitch-count seam section from 20 stitches to 25 stitches.

If stitch counting (pushbutton 1) was turned off.

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Display after power on:
-> Maximum speed
-> Type designation

1

Press pushbutton 1 briefly.
LED beside pushbutton 1 lights up,
stitch counting is turned on.

Stc 020

Display:
20 stitches are set

+

Press pushbutton +,
number of stitches increases.

Stc 025

Display:
25 stitches are set
Changes are automatically entered after
3 seconds.

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Display after approx. 3 seconds:
-> Maximum speed
-> Type designation

If stitch counting (pushbutton 1) was turned on.

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Display after power on:
-> Maximum speed
-> Type designation

1

Press pushbutton 1 for at least 1 second,
LED beside pushbutton 1 goes off
momentarily, function stitch counting
remains on.

Stc 020

Display:
20 stitches are set

+

Press pushbutton +,
number of stitches increases.

Stc 025

Display:
25 stitches are set
Changes are automatically entered after
3 seconds.

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Display after approx. 3 seconds:
-> Maximum speed
-> Type designation

With the sewing start the new value is saved.

Function key F

By the function key (pushbutton 3) various parameters, also from a higher level, can be switched on or off.

This pushbutton can be set to the following functions:

1. Snh Needle cooling ON/OFF
2. hP High lift walking counting ON/OFF
3. Sdi Differential feed counting ON/OFF
4. SrS Ornamental backtack ON/OFF
5. SSt Softstart ON/OFF
6. Frt Function operating mode stored/not stored (pushbutton for differential feed or high lift walking)

The setting of the F pushbutton can be changed as follows:

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Display after power on.
-> Maximum speed
-> Type designation

P

Press pushbutton P.

E

Press pushbutton E.

3

Press pushbutton 3 (function key F),
corresponding LED blinks.

-F- 1

Display:
Actual status (needle cooling ON/OFF)

-

Press pushbutton -.
(+ increases, - decreases the display value)

-F- 5

Display:
New status (Softstart ON/OFF)

P

Press pushbutton P.

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Setting is terminated, display:
-> Maximum speed
-> Type designation

The number of Softstart stitches can be changed as follows:

Example: change number of stitches from 1 to 3 (function Softstart (pushbutton 3) was turned off).

3

Press pushbutton 3 briefly.
LED beside pushbutton 3 lights up,
function Softstart is turned on.

SSc 001

Display:
1 stitch is set

+

Press pushbutton +,
number of stitches increases.

SSc 003

Display:
3 stitches are set
Changes are automatically entered after
3 seconds.

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Display after approx. 3 seconds:
-> Maximum speed
-> Type designation

If Softstart (pushbutton 3) was turned on.

F

Press pushbutton F at least for 1 second,
LED beside pushbutton F goes off
momentarily, function Softstart remains
on.

SSc 001

Display:
1 stitch is set

+

Press pushbutton +,
number of stitches increases.

SSc 003

Display:
3 stitches are set

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Display after approx. 3 seconds:
-> Maximum speed
-> Type designation

With the sewing start the new value is saved.

6.4 Programming Seams (Teach-in)

- A maximum of 8 patterns with a total of 40 seams can be established.
- Programming is possible only if no code number was inputted after switching on!
- The functions start backtack, end backtack, stitch counting, thread trimming and presser foot lifting can be assigned individually to each seam.
- Backward sewing by reversing the feeding direction can only be programmed in the teach-in mode.

```

Example 1: Pattern 1      40 seams
              Pattern 2-8    0 seams
Example 2: Pattern 1      4 seams
              Pattern 2      5 seams
              Pattern 3      6 seams
              Pattern 4     25 seams
              Pattern 5-8    0 seams
Example 3: Pattern 1     10 seams
              Pattern 2     15 seams
              Pattern 3-8    0 seams
  
```

Examples 1 and 2 show that optimal utilization of the storage capacity is possible.

6.4.1 Teach-in Mode

- Each seam pattern is programmed and stored separately.
- After input of the pattern the teach-in mode must be exited.
- Saving is done by sewing start.

Display configuration:

X	YY	ZZZ	X	Pattern number (1...8)
LS	SSS		YY	Seam number (0...40)

ZZZ Stitches for the seam with stitch counting (0...254)
 LS appears when light barrier function on
 SSS Stitches after light barrier sensing (0...254)

Programming:

1	->	P	==>	LED pushbutton P blinks	==>	
2	->	E	==>	Display of a parameter on the operator level	==>	aaa bbb
3	->	2	==>	LED pushbutton 2 blinks Entry into pattern and seam programming	==>	1 01 ---
4	->	2	==>	Changing the pattern number	==>	2 01 ---

By the pushbuttons on the Variocontrol the seam functions can be programmed (e.g. presser foot lifting, start backtack, etc.)

Example: seam with stitch counting:

- > 1 ==> Turning on the stitch counting; display of the actual stitches. ==> 2 01 004
- > 1 ==> Turning on backward sewing (display "-" in front of the number of stitches). Switching to forward sewing by pressing the pushbutton again. ==> 2 01-004

Backward sewing, including backtack, is performed in reversed feeding direction. The functions "light barrier seam" and "backward seam" block each other, i.e. the light barrier cannot be switched on when the backward seam is selected, and vice versa, a backward seam is impossible when the light barrier is switched on.

- > + -> - Changing the stitches by pushbuttons +/- or sewing the seam by using the pedal.

Example stitch counting and/or light barrier:

- > 0 ==> Turning on the light barrier; display of the actual number of compensating stitches. ==> 2 01 004
LS 007

Only with V740!

- > 0 ==> Turning on the transmitted light barrier; display of the sensitivity level in the bottom line. ==> 2 01 004
LS 3 007

Only with V740!

- > L ==> Select the desired sensitivity level. ==> 2 01 004
LS 4 007

With V720/V730/V740!

- > + -> - Modification of the number of light barrier compensating stitches

If stitch counting and light barrier are turned on at the same time the stitches for stitch counting have to be programmed before the light barrier compensating stitches.

After programming the function ==>

- > E ==> Enter the seam. Display of the next seam. ==> 2 02 ---

-> The seam is entered by pressing the pushbutton E or by heelback.

- > P ==> Exit programming! Display of the first seam section to be executed in the selected pattern. ==> 2 01 004
LS 007

After all seams have been programmed, each seam can be recalled individually by pushbutton E for checking.

Note:
Several seam patterns cannot successively be programmed without interruption. Each pattern must be terminated by pushbutton P, otherwise it gets lost.

Note:
The patterns are permanently saved only after the sewing start

Detailed Example:

A seam 1 with stitch counting and start backtack, a seam 2 with stitch counting and a seam 3 with light barrier seam and end backtack are to be programmed under the pattern number 4.

	Display before programming		
		==>	xxxx XY82ZV
1. ->	P ==> LED pushbutton P blinks	==>	
2. ->	E ==> Display of a parameter on the operator level	==>	aaa bbb
3. ->	2 ==> LED pushbutton 2 blinks ==> Pattern 1, seam 1	==>	1 01 ---
4. ->	2 ==> LED pushbutton 2 blinks ==> Pattern 2, seam 1	==>	2 01 ---
5. ->	2 ==> LED pushbutton 2 blinks ==> Pattern 3, seam 1	==>	3 01 ---
6. ->	2 ==> LED pushbutton 2 blinks ==> Pattern 4, seam 1	==>	4 01 ---
7. ->	7 ==> LED bottom pushbutton 7 lights up ==> Single start backtack is on	==>	4 01 ---
8. ->	6 ==> LED pushbutton 6 lights up ==> Foot lifting at the seam end is on	==>	4 01 ---
9. ->	1 ==> Stitch counting is on	==>	4 01 000
10. ->	+ -> - Changing the number of stitches by pushbuttons or by using the pedal		4 01 017
	==> Seam length of 17 stitches is set		
11. ->	E ==> Pattern 4, seam 2	==>	4 02 ---

12.	->	<input type="text" value="1"/>	==>	Stitch counting is on	==>	<input type="text" value="4 02 000"/>
13.	->	<input type="text" value="+"/>	->	<input type="text" value="-"/>	Changing the number of stitches by pushbuttons or by using the pedal	<input type="text" value="4 02 008"/>
			==>	Seam with 8 stitches is set		
14.	->	<input type="text" value="E"/>	==>	Pattern 4, seam 3 Free seam is selected	==>	<input type="text" value="4 03 ---"/>
15.	->	<input type="text" value="0"/>	==>	Light barrier is activated	==>	<input type="text" value="4 03 ---"/> LS 000
16.	->	<input type="text" value="+"/>	->	<input type="text" value="-"/>	Changing the stitches by pushbuttons 5 compensating stitches are set	<input type="text" value="4 03 ---"/> LS 005
17.	->	<input type="text" value="8"/>	==>	LED top pushbutton 8 lights up Single end backtack is on	==>	<input type="text" value="4 03 ---"/> LS 005
18.	->	<input type="text" value="9"/>	==>	LED bottom pushbutton 9 lights up Thread trimmer is on	==>	<input type="text" value="4 03 ---"/> LS 005
19.	->	<input type="text" value="E"/>	==>	Pattern 4, seam 4 By changing to the next seam the settings of the preceding seams are automatically entered.	==>	<input type="text" value="4 04 ---"/>
20.	->	<input type="text" value="P"/>	==>	Programming completed, first seam can be executed	==>	<input type="text" value="4 01 017"/>

6.4.2 Max. Number of Seams Exceeded

If the total number of 40 seams is exceeded by inputting a program, for the time being, the teach-in mode cannot be completed by pushbutton P.

A further sewing start is impaired.

The display shows the warning below.

Pressing pushbutton P again causes the deletion of the pattern indicated on the display. The teach-in mode is exited if the total number of 40 seams is not exceeded. Otherwise a new warning will be indicated.

Display:

DELETE X YY NN	X: Last input and/or recalled pattern number (1...8) YY: Number of programmed seams of the recalled pattern (0...40) NN: Total number of input seams
-------------------	--

The operator must now decide which pattern is to be deleted!

-> 2 ==> Call-up of the pattern to be deleted

DELEtE
X YY NN

X: Pattern number
 YY: Number of seams of this pattern
 NN: Total number of input seams

-> P ==> Deletion of the pattern

DELEtE
X YY NN

X: Pattern number of the deleted pattern
 YY: 00 = no more seam is programmed
 NN: Total number of input seams if more than 40

When 40 seams are exceeded, the teach-in mode is exited, and the last input seam will be indicated.

6.4.3 Execution (Pattern) Mode

1. Switch on mode by pushbutton 2 (LED lights up)

-> 2
==> X 01 ZZZ
2. Select pattern 1...8
- Seam number 01 is displayed

-> +
-> -
==> X 01 030
3. If one should not start with seam 1 select different seam number
- Push button E several times until desired seam number is displayed

-> E
==> 2 05 ZZZ

■ The pattern can now be started by pushing the pedal.

Exit the execution (pattern) mode
- Switch off by pushbutton 2

-> 2

7. Functions and Settings

7.1 First Stitch after Power On

Functions	Abbreviation on the display	Parameter
1 stitch at npos after POWER ON Positioning speed	Sn1 n1	F-231 F-110

At the first start after power on, the drive runs at positioning speed (n1) for one rotation from pos. 1 to pos. 1, independent from the pedal position and set start backtack speed if parameter Sn1 is on.

7.2 Selection of Machine Class

Functions	Abbreviation on the display	Parameter
Display of machine class	SEL	F-280

Basic machine class LU-2210 F-280 = 1

7.3 Program Identification

Functions	Abbreviation on the display	Parameter
Display program no. and date		F-179

The program number with index is shown in the top line on the display, and an 8-digit identification number in the bottom line .

Display example parameter 179:

PrG3225A	<-- Program number: 3225 / Index: A
92031211	<-- Identification number: 92031211

7.4 Function Key (Pushbutton 3)

Functions	Abbreviation on the display	Parameter
Determine function for pushbutton 3	-F-	F-008

By the function key (pushbutton 3) a preprogrammed function can be switched on or off directly.

Functions that can be programmed:

- F-008 = 1 - Needle cooling ON/OFF
- F-008 = 2 - Counting high lift walking ON/OFF
- F-008 = 3 - Counting differential feed ON/OFF
- F-008 = 4 - Ornamental backtack ON/OFF
- F-008 = 5 - Softstart on/off
- F-008 = 6 - Function operating mode stored/not stored (pushbutton for differential feed or high lift walking)

7.5 Display Actual Speed

Functions	Abbreviation on the display	Parameter
Display actual speed	nIS	F-139

If parameter F-139 is switched ON the following information is shown on the display:

During machine run:

- the actual speed
- Example: 2350 rotations per minute

2350

At machine standstill:

- the adjusted maximum speed and the type of control
- Example: 3300 rotations per minute and control type XY82ZV

3300
XY82ZV

At stop in the seam:

- the stop indication

StoP

7.6 Direction of Rotation of the Motor

Functions	Abbreviation on the display	Parameter
Direction of rotation of the motor	drE	F-161

- Look at the motor shaft:
- F-161 = 0 - clockwise rotation
 - F-161 = 1 - anticlockwise rotation

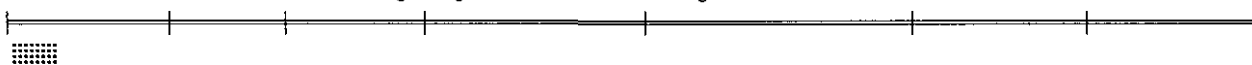


Attention

If the motor is mounted differently, e.g at a different angle or with gear, make sure that the parameter value is assigned correctly to the direction of rotation.

7.7 Softstart

Softstart or Stitch or or Stitch counting with Trimming signals
 Start backtack Free seam counting Light barrier seam light barrier end End backtack Reversion



Functions	Abbreviation on the Display	Parameter
Sofstart number of stitches	SSc	F-100
Softstart speed	n6	F-115
Softstart on/off	SSt	F-134

Function:

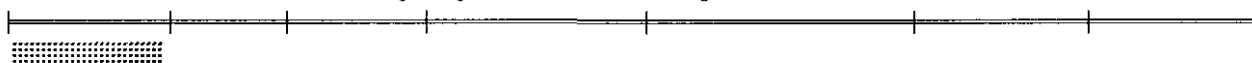
- after power on
- at the beginning of a new seam
- speed limited (n6), pedal controlled
- lower speed of a function running parallel predominates (e.g. start backtack, stitch counting)
- stitch counting synchronized to position 1
- interruption with pedal in position 0 (neutral)
- interruption by full heelback (stage -2), when start backtack off

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Softstart on/off	-F-	F-008 = 5

7.8 Start Backtack

Softstart or Stitch or or Stitch counting with Trimming signals
 Start backtack Free seam counting Light barrier seam light barrier end End backtack Reversion



Functions	Abbreviation on the display	Parameter
Single/double off		Pushbutton 7
Number of stitches forward	Arv	F-000
Number of stitches backward	Arr	F-001
Start backtack speed	n3	F-112
Run-out time	t1	F-200
Start delay from lifted foot	t3	F-202
Stitch correction time	t8	F-150
Synchronization of start backtack	SYn	F-283

The start backtack starts by pushing the pedal forward at the beginning of the seam. The backtack is delayed by the time t3 from lifted foot (start delay from lifted foot).

The backtack is executed automatically at start backtack speed. It cannot be interrupted. With softstart running parallel, the respective lower speed predominates.

The counting is synchronized to position 1.

- F-283 = 1 / 2 Switching on start backtack synchronized to position 1
- F-283 = 3 Switching on and off start backtack synchronized to position 1A
- F-283 = 4 Switching on and off start backtack synchronized to position 2

After the execution of the backward seam, the backtacking signal, and, after a delay time t1, the start backtack speed, will be turned off. Then pedal control is returned.

7.8.1 Double Start Backtack

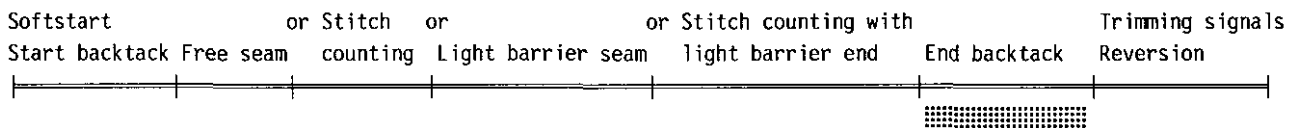
The forward section will be sewn for an adjustable number of stitches. Then, the signal for the stitch regulator will be emitted, and the backward section will be executed. For both sections the number of stitches is separately adjustable.

With slow backtack mechanisms, for the double start backtack, the stitch regulator can be delayed with a time-lag of t8 (start backtack stitch correction), which prolongs the backward section.

7.8.2 Single Start Backtack

The backtacking signal will be emitted for a number of stitches that can be set, and the backward section will be sewn.

7.9 End Backtack



Functions	Abbreviation on the display	Parameter
Single/double/off		Pushbutton 8
Number of stitches backward	Err	F-002
Number of stitches forward	Erv	F-003
End backtack speed	n4	F-113
Last stitch backward on/off	FAr	F-136
Stitch correction time	t9	F-151
Start delay from lifted foot	t3	F-202
Synchronization of end backtack	SYn	F-283

The end backtack starts either by heelback, in the case of seams with stitch counting at the end of the counting, or from the light barrier seam at the end of the light barrier compensating stitches. From machine standstill, the stitch regulator will be turned on immediately. From lifted foot, the switch-on point is delayed by the time t3 (start delay from lifted foot). The first leading position 1 is counted as 0 stitch, whenever the function is started outside of position 1. The counting is synchronized to position 1.

- F-283 = 1 Switching on end backtack synchronized to position 1
- F-283 = 2 Switching on end backtack synchronized to position 2
- F-283 = 3 Switching on and off end backtack synchronized to position 1A
- F-283 = 4 Switching on and off end backtack synchronized to position 2

From full machine run, the signal will be turned on only after reaching the end backtack speed and the synchronization to position 2. The end backtack will be performed automatically. An interruption is not possible.

7.9.1 Double End Backtack

The backward section will be sewn for a number of stitches. Then, the stitch regulator will be turned off, and the forward section will be executed. For both sections the number of stitches is separately adjustable.

After the execution of the forward section, the trimming function will be initiated. During the entire operation the sewing speed is reduced to end backtack speed, with the exception of the last stitch, which will be executed at positioning speed n1.

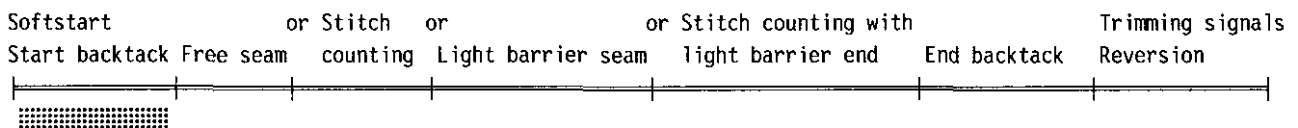
With slow backtack mechanisms, for the double end backtack, the stitch regulator can be delayed with a time lag of t9 (end backtack stitch correction).

7.9.2 Single End Backtack

The single end backtack is sewn at end backtack speed. During the last stitch the speed is reduced to positioning speed. Depending on parameter F-136 (Far) the stitch regulator remains on or turns off.

- Parameter F-136 = ON last stitch backward
- Parameter F-136 = OFF last stitch forward

7.10 Start Ornamental Backtack



Functions	Abbreviation on the display	Parameter
Single/double/off		Pushbutton 7
Number of ornamental backtacking stitches forward	Arv	F-000
Number of ornamental backtacking stitches backward	Arr	F-001
Start backtack speed	n3	F-112
Ornamental backtack on/off	SrS	F-135
Start delay from lifted foot	t3	F-202
Ornamental backtack stop time	tSr	F-210

Differences from the standard start backtack:

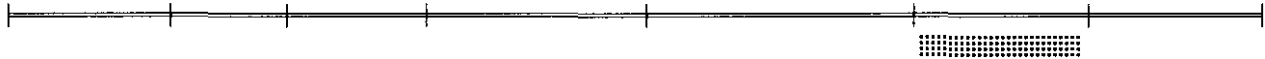
- The drive stops for the switching of the stitch regulator
- The stop time can be adjusted

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Ornamental backtack on/off	-F-	F-008 = 4

7.11 End Ornamental Backtack

Softstart or Stitch or or Stitch counting with Trimming signals
 Start backtack Free seam counting Light barrier seam light barrier end End backtack Reversion



Functions	Abbreviation on the display	Parameter
Single/double/off		Pushbutton 8
Number of ornamental backtacking stitches backward	SEv	F-083
Number of ornamental backtacking stitches forward	n3	F-113
End backtack speed	SrS	F-135
Ornamental backtack on/off	t3	F-202
Start delay from lifted foot	tSr	F-210
Ornamental backtack stop time		

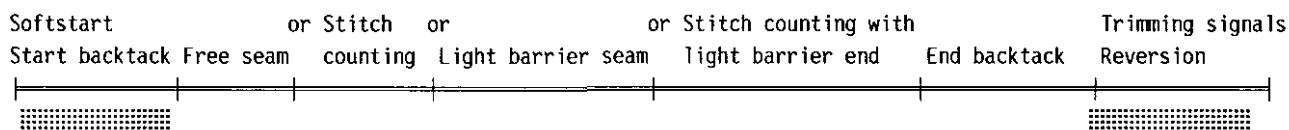
It corresponds to the normal end backtack. Between the various seam sections the drive stops in position 1 for the ornamental backtack stop time (tSr). The number of stitches of the forward and backward section can be set separately.

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Ornamental backtack on/off	-F-	F-008 = 4

7.12 Suppression/Recall of Backtack

■ Effective in standard and ornamental backtack

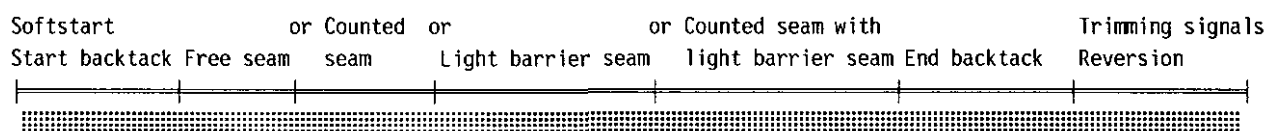


The subsequent backtacking operation can be suppressed or recalled once by the external pushbutton.

When pressing	Start back-tack On	Start back-tack Off	End back-tack On	End back-tack Off
Before start of seam	no backtack	backtack	---	---
In the seam	---	---	no backtack	backtack

The double backtack is performed in the above cases.

7.13 Intermediate Backtack



The backtack solenoid can be switched on anywhere in the seam by the external pushbutton connected to socket B5/1.

The intermediate backtack is synchronized to position 2, whenever it is switched on and/or off.

- Firing of the backtack solenoid at machine standstill is possible, when the drive is in position 2.

7.14 Activation of the Backtack Solenoid

Functions	Abbreviation on the display	Parameter
Time of full power	t10	F-212
Operating time for pulsing	t11	F-213

The backtack solenoid is promptly activated by full power.

Then the solenoid is switched to partial power in order to reduce the load for the control and for the connected solenoid.

The duration of full power is set by F-212, the holding power at partial power by F-213.

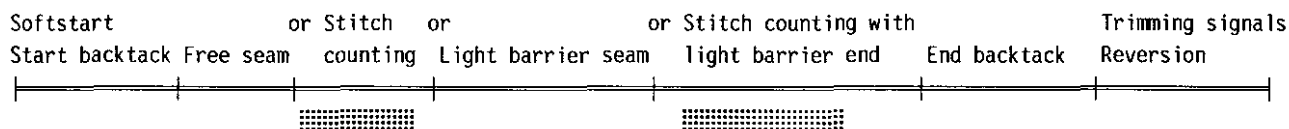


Caution!

If the holding power is set too high the solenoid and the control may be permanently damaged. Please observe the allowed operating time of the solenoid and set the appropriate value according to the tabel below.

Stage	Operating time	Effect
1	12.5 %	low holding power
2	25 %	
3	37.5 %	
4	50 %	
5	62.5 %	
6	75 %	
7	87.5 %	high holding power
0	100 %	full power

7.15 Seam with Stitch Counting



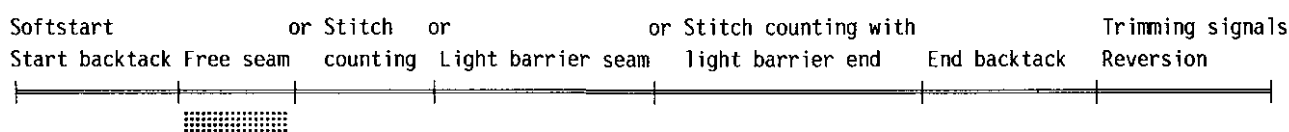
Functions	Abbreviation on the display	Parameter
Stitch counting on/off		Pushbutton 1
Number of stitches	Stc	F-007
Stitch counting speed	n12	F-118
Speed mode for a seam with stitch counting	SGn	F-141

Speed control for the stitch counting can be selected by the speed mode.

- Mode 0: Execution at pedal controlled speed.
- Mode 1: Execution at fixed speed n12 as long as pedal is pushed.
- Mode 2: Execution at limited speed n12 as long as pedal is pushed.
- Mode 3: Automatic execution at fixed speed as soon as the pedal has been pushed once. Termination is possible by "heelback (-2)".

The sewing speed is reduced in each stitch depending on the actual speed (max. 11 stitches before the end of the stitch counting) in order to be able to stop exactly at the end of the stitch counting. When the light barrier is switched on, free sewing will be performed after the stitch counting.

7.16 Free Seam and Seam with Light Barrier



Functions	Abbreviation on the display	Parameter
Positioning speed	n1	F-110
Upper limit of the maximum speed	n2 ⁻	F-111
Maximum speed		see display
Lower limit of the maximum speed	n2 ₋	F-121
Limited speed	n12	F-118
Speed mode Free seam	SFn	F-142

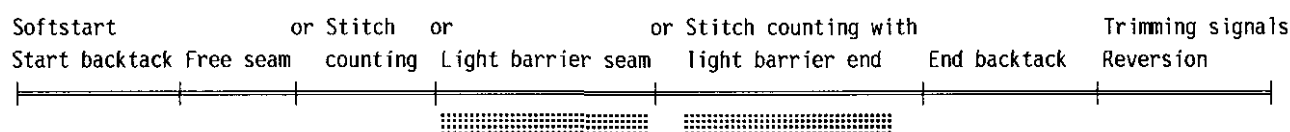
Speed control for the free seam can be selected by the speed mode.

- Mode 0: Execution at pedal controlled speed from n1 to nmax.
 Mode 1: Execution at fixed speed n12, when pedal is forward (position > =1).
 Mode 2: Execution at limited speed n12, when pedal is forward (position > =1)
 Mode 3: Only for the seam with light barrier:
 Automatic execution at fixed speed as soon as the pedal has been pushed once. The seam end is initiated by the light barrier. Termination by heelback (-2) is possible.

If the light barrier is not active the speed is pedal controlled up to nmax corresponding to the adjustment of parameter F-111.

The maximum speed will be indicated on the display after power on and thread trimming and can be changed directly by pushbuttons +/- on the Variocontrol. The setting range is limited by the set values of the parameters F-111 and F-121.

7.17 Light Barrier



7.17.1 General Light Barrier Functions (V720, V730, V740)

Functions	Abbreviation on the display	Parameter
Light barrier compensating stitches	LS	F-004
Number of light barrier seams	LSn	F-006
Speed after light barrier sensing	n5	F-114
Light barrier sensing uncovered	LSd	F-131
Sewing start blocked with light barrier uncovered	LSS	F-132
Light barrier seam end with thread trimming	LSE	F-133

- After sensing the seam end, counting of the compensating stitches at light barrier speed is performed.
- Stop of the drive with pedal in position 0 (neutral) is possible.
- Disabling of the thread trimming operation by parameter F-133, independent of pushbutton 9 on the Variocontrol. Stop in the basic position.
- Programming of up to 15 light barrier seams with stop in the basic position. After the last light barrier seam, a thread trimming operation will be performed.
- Light barrier sensing end (uncovered) or beginning of fabric (covered), can be selected by parameter F-131.
- Blocking of machine start, when light barrier is uncovered, can be programmed by parameter F-132.

7.17.2 Reflection Light Barrier (V720, V730)

Functions	Abbreviation on the display	Parameter
Light barrier on/off Sensitivity adjustment when using LS001		Pushbutton 0 Potentiometer on the V730
Mechanical adjustment of the light barrier LS001	SR5	F-174

Adjustments

Sensitivity:

Depending on the distance of the light barrier to the reflection area, adjust sensitivity to a minimum. (Turn potentiometer as far as possible to the left).

- LS001 - Potentiometer on the Variocontrol
- LSM001 - Potentiometer directly on the light barrier module

Mechanical Adjustment:

- LS001 - Addressing of parameter F-174 to indicate optimal mechanical adjustment by bargraph display.
- By orienting the light barrier over the reflection area the highest possible bargraph level must be reached, then fix light barrier in this position.
- LSM001 - The orientation is facilitated through a visible light spot on the reflection area.

7.17.3 Transmitted Light Barrier (V740)


Functions	Abbreviation on the display	Parameter
Light barrier on/off Switch between fabric ply/end sensing Select sensitivity levels Sensitivity adjustment		Pushbutton 0 Pushbutton 0 Pushbutton L Pushbuttons + and -
Sensitivity adjustment Mechanical adjustment	LSI SR5	F-009 F-174



Sensitivity adjustment:

- 8 levels can be programmed with parameter F-009 and pushbutton "L".
- Each level from 0-255 adjustable with pushbuttons +/-.
- Bargraph and valency indication on the display.

Select the sensitivity level:

- Level 1 - 7, when sewing with fabric ply sensing. Select by pushbutton "L" possible before each seam.
- Level 8, when sewing with seam end sensing. Automatic selection by the control.

»  ==> When pressing pushbutton "L" once, the adjusted sensitivity level and the adjusted sensitivity will be indicated. Select the next sensitivity level with each actuation of the pushbutton.

»  »  The sensitivity can then be changed immediately. If there is no more change of values the display changes back to the initial status. Sewing is possible again

Note:

Sensitivity level 8 can only be adjusted on the technician or supplier level.

Mechanical adjustment of the light barrier sensor

- Address parameter F-174 to indicate optimal mechanical adjustment by bargraph display.
- The transmitted light barrier sender is to be oriented such that the highest possible bargraph level is reached.
- When the upper and/or lower limit of the bargraph is exceeded, the sensitivity is adjusted automatically by pressing the pushbutton "L" such that the bar is in central position. The above adjustment can then be continued.

7.17.4 Automatic Start by Light Barrier (V730, V740)

Functions	Abbreviation on the display	Parameter
Delay of automatic start	ASd	F-128
Automatic start on/off	ALS	F-129
Sewing start blocked with light barrier uncovered	LSS	F-132

The sewing can be started automatically by this function as soon as the light barrier has sensed the insertion of fabric.

The following conditions must be met:

- Parameter F-132 = on (no sewing start, when light barrier uncovered).
- Parameter F-129 = on (Automatic start on).
- Light barrier switched on at the Variocontrol (pushbutton 0).
- The pedal must remain pushed forward at the seam end.

For safety reasons, this function becomes active only after a normal sewing start in the first seam. The light barrier must be covered, when the pedal is in neutral position; then pedal forward.

This safety function is reset, when the pedal does not remain pushed forward after the end of the seam.

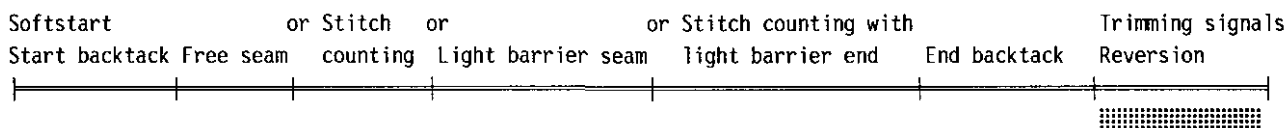
7.17.5 Light Barrier Filter for Knitted Fabrics

Functions	Abbreviation on the display	Parameter
Number of filter stitches	LSF	F-005
Light barrier filter on/off	LSF	F-130

The filter prevents premature triggering of the light barrier function, when sewing knitted fabrics.

- By parameter F-130 the filter can be switched on or off.
- By changing the number of filter stitches the mesh will be adapted.

7.18 Thread Trimmer/Thread Tension Release/ Thread Wiper



Functions	Abbreviation on the display	Parameter
Thread trimmer/thread wiper on/off		Pushbutton 9
Trimming stitch backward	FAr	F-136
Activation time thread trimmer	t6	F-205
Delay time end thread wiper until start presser foot lifting	t7	F-206
Stop time for thread trimmer	tFA	F-290
Switch-off delay of thread tension after thread trimming	tFS	F-291

The function "thread trimming" and/or "thread wiping" is switched on by pushbutton 9.

If the function "trimming stitch backward" is switched on (F-136 = on) the backtack solenoid remains on during the single end backtack until the stop in position 2A.

The thread trimmer is switched on with leading position 1 and switched off with trailing position 1.

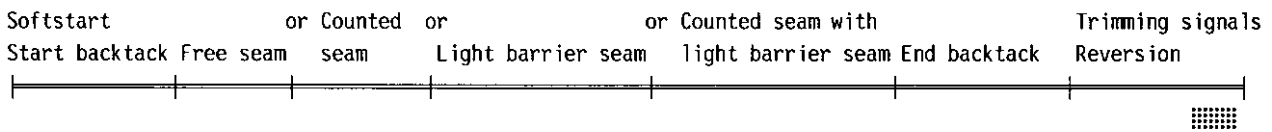
In between, the drive stops for the time tFA.

The thread tension release is switched on with leading position 2 and is switched off with a time lapse tFs after position 2.

After thread trimming the drive always stops in position 2A.

The thread wiper can only be switched on in conjunction with the thread trimmer. The activation time can be modified by parameter F-205 (t6) and the delay time between thread wiper and the presser foot by parameter F-206 (t7).

7.19 Reversion



Functions	Abbreviation on the display	Parameter
Positioning speed	n1	F-110
Delay time reversion	drd	F-181
Number of reversion increments	InP	F-183
Reversion ON/OFF	Frd	F-194

"Reversion" is performed after the stop with pedal in position -2.

When the stop position is reached, the drive stops for the duration of the activation delay of reversion (F-181).

Then it reverses at positioning speed for an adjustable number of increments.

1 increment corresponds to approx. 0.7°.

During reversion the presser foot lifting functions remain on.

Reversion is only possible, when parameter F-194 is on.

7.20 Presser Foot Lifting

Functions	Abbreviation on the display	Parameter
Automatic in the seam Automatic after trimming		Pushbutton 5 Pushbutton 6
Activation delay when pedal is in position -1, half heelback	t2	F-201
Start delay from lifted foot	t3	F-202
Time of full power	t4	F-203
Operating time with pulsing	t5	F-204

Presser foot is lifted:

- in the seam
 - by heel back (position -1)
 - or automatically (pushbutton 5)
- after trimming
 - by heelback (position -1 or -2)
 - or automatically (pushbutton 6)
 - by light barrier, automatically
 - by stitch counting, automatically
 - activation delay after thread wiping (t7)
 - activation delay without thread wiping (tFL)

Unintentional foot lifting before thread trimming, when changing from pedal position 0 (neutral) to position -2, can be prevented by setting an activation delay (F-201).

Holding power of the lifted foot:

The presser foot is lifted by full power. Then the solenoid is switched to partial power in order to reduce the load for the control and for the connected solenoid.

The duration of full power is set by F-203, the holding power at partial power by F-204.

**Caution!**

If the holding power is set too high the solenoid and the control may be permanently damaged. Please observe the allowed operating time of the solenoid and set the appropriate value according to the label below.

Stage	Operating time	Effect
1	12.5 %	low holding power
2	25 %	
3	37.5 %	
4	50 %	
5	62.5 %	
6	75 %	
7	87.5 %	
0	100 %	full power

Foot lowers:

- from manual foot lifting, when pedal is in position 0 (neutral) (position ≥ 0)
- from automatic foot lifting, when pedal heeled forward (position > 0)

The start is delayed until the foot has securely lowered.

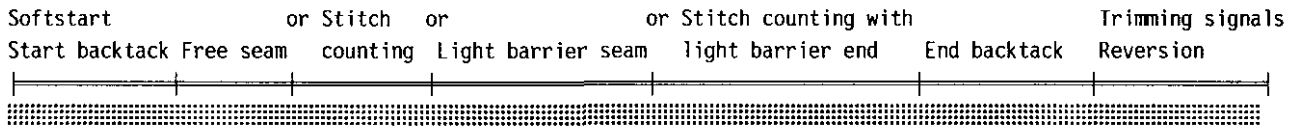
- delay time adjustable F-202

7.21 Blocking of Machine Run (Safety Switch)



Caution!

This is not a safety function.
The line voltage must still be switched off during maintenance and repair work.



Functions	Abbreviation on the display	Parameter
New start by pedal in position 0 (neutral)	LSP	F-281
Blocking of machine run (safety switch) break (N.)/ make (N.0.) contact	LOS	F-282

Display after activation of the blocking of machine run:

Symbol --StoP-- blinking alternately !
--StoP--

The input blocking of machine run can activate 3 different functions:
blocking of machine start, blocking of machine run and run/stop.

Blocking of machine start:

If the input blocking of machine run is activated at machine standstill the run of the drive is blocked despite pushing the pedal or pressing the pushbutton needle up/down. The presser foot lifting functions remain on. A start is only possible after deactivation of the input.

Blocking of machine run:

If the input blocking of machine run is activated in the seam the run of the drive is interrupted, the drive stops in the selected basic position. If the seam end was initiated by heelback or by light barrier only the trimming functions are performed, and the drive stops in position needle up. The presser foot lifting functions remain on. A start is only possible after deactivation of the input and subsequent sensing of pedal position 0 (neutral).

Run/stop:

Functions as blocking of machine run, but the drive starts immediately with pedal in position > 1 and deactivation of the input, before the signal pedal in position 0 (neutral). Condition F-281 = OFF. Automatic sequences such as start backtack, stitch counting or end backtack can be interrupted.

7.22 Needle up / Single Stitch

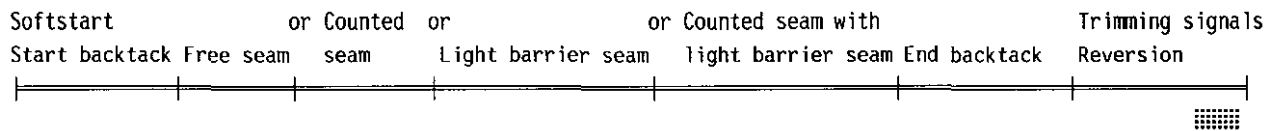
Functions	Abbreviation on the display	Parameter
Mode setting of pushbutton needle up / down	mht	F-140

The following functions can be set at socket B5/3 by parameter F-140.

- Mode 0** Function **needle up**. When pressing the pushbutton, the drive runs from position 1 to the reverse position.
If the drive is outside of the slot of position 1 it does not move for safety reasons.
- Mode 1** Function **needle up/down**. When pressing the pushbutton, the drive runs from position 1 to the reverse position and/or from the reverse position to position 1. If the drive is outside of the stop position, it runs to the next possible position.
- Mode 2** Function **full stitch**. When pressing the pushbutton, the machine performs one entire rotation. After power ON this input has no function.
- Mode 3** When pressing the pushbutton at machine standstill, the function **needle up** is performed, and the **intermediate backtack** is performed during machine run.
- Mode 4** When pressing the pushbutton at machine standstill, the function **needle up/down** is performed, and the **intermediate backtack** is performed during machine run.
- Mode 5** When pressing the pushbutton at machine standstill, one **full stitch** is performed, and the **intermediate backtack** is performed during machine run.
- Mode 6** When pressing the pushbutton, an **intermediate backtack** is performed anywhere in the seam.

Note:
The reverse position is position 2a minus the set number of increments of parameter F-183. If parameter F-183 = 0 the drive stops in position 2A after trimming.

7.23 Needle Cooling



Functions	Abbreviation on the display	Parameter
Prolongation needle cooling after stop	dnh	F-184
Needle cooling ON/OFF	Snh	F-186

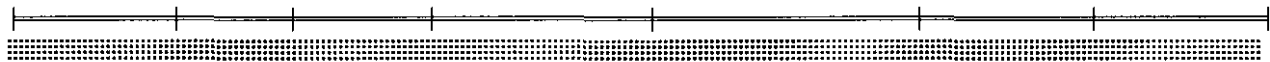
Needle cooling is on during the entire sewing procedure. It can be switched off after the stop with a time lapse "prolongation needle cooling after stop".

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Needle cooling On/Off	-F-	F-008 = 1

7.24 High Lift Walking

Softstart or Stitch or or Stitch counting with Trimming signals
 Start backtack Free seam counting Light barrier seam light barrier end End backtack Reversion



Functions	Abbreviation on the display	Parameter
High lift walking speed	n10	F-117
High lift walking speed run-out time	thP	F-152
Minimum number of high lift walking stitches	chP	F-185
Minimum number of high lift walking stitches On/Off	ShP	F-187

High lift walking not stored (operating mode not stored)

If the function "high lift walking operating mode not stored" is programmed or switched (KN16) the output "high lift walking" is switched on, when pressing down the pushbutton "high lift walking".

If parameter "minimum number of high lift walking stitches" is on (F-187 = on) at least the number of stitches set with parameter F-185 is performed.

High lift walking stored (operating mode stored)

If the function "high lift walking operating mode stored" is programmed or switched (KN16) the output "high lift walking" is switched on, when pressing the pushbutton "high lift walking". By pressing the pushbutton again the output is switched off. This function is independent from the set minimum number of stitches (F-185).

Reaction at speeds </> high lift walking speed

When pressing the pushbutton at machine standstill or during machine run at a speed lower than high lift walking speed, the output is switched on immediately. The maximum speed is limited to high lift walking speed.

If the actual speed is higher than the high lift limitation speed the drive slows down to high lift limitation speed before switching on the output.

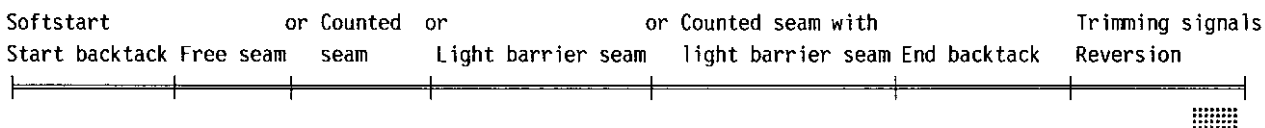
After switching off high lift walking the speed limitation is terminated after the run-out time.

- If the functions high lift walking and differential feed are activated at the same time the lower speed dominates.

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Counting high lift walking ON/OFF	-F-	F-008 = 2

7.25 Differential Feed



Functions	Abbreviation on the display	Parameter
Differential feed speed	n11	F-193
Differential feed speed run-out time	tdi	F-188
Minimum number of differential feed stitches	cdi	F-189
Minimum number of differentail feed stitches On/Off	Sdi	F-190

Differential feed not stored (operating mode not stored)

If the function "differential feed operating mode not stored" is programmed or switched (KN16) the output "differential feed" is switched on, when pressing down the pushbutton "differential feed".

If parameter "minimum number of differential feed stitches" is on (F-190 = on) at least the number of stitches set with parameter F-189 is performed.

Differential feed stored (operating mode stored)

If the function "differential feed operating mode stored" is programmed or switched (KN16) the output "differential feed" is switched on, when pressing the pushbutton "differential feed". By pressing the pushbutton again the output is switched off. This function is independent from the set minimum number of stitches (F-189).

Reaction at speeds </> differential feed speed

When pressing the pushbutton at machine standstill or during machine run at a speed lower than differentail feed speed, the output is switched on immediately. The maximum speed is limited to differential feed speed.

If the actual speed is higher than the differential feed speed the drive slows down to differential feed speed before switching on the output.

After switching off differential feed the speed limitation is terminated after the run-out time.

- If the functions high lift walking and differential feed are activated at the same time the lower speed dominates.

Direct access by function key (pushbutton 3)

Functions	Abbreviation on the display	Parameter
Counting differential feed ON/OFF	-F-	F-008 = 3

7.26 Switch for High Lift Walking and Differential Feed Functions

Funktionen	Abbreviation on the display	Parameter
KN16 switching High lift walking/differential feed	k16	F-191
Switching high lift walking or differential feed operating mode stored/not stored	Fr _t	F-192

The control is suitable for the connection of a knee switch (KN16) or of two separate pushbuttons for activating the functions high lift walking and/or differential feed.

7.26.1 High Lift Walking or Differential Feed by Knee Switch (KN16)

The function to be activated by the knee switch can be programmed.

- F-191 = off, differential feed
- F-191 = on, high lift walking

The operating mode stored or not stored can be programmed or switched by the flip switch on the KN16.

- F-192 = off, operating mode not stored
- F-192 = on, operating mode stored

The KN16 commutator is only effective if parameter F-192 is programmed to "off" (operating mode not stored).

7.26.2 High Lift Walking or Differential Feed by Separate Pushbuttons

When pressing a separate pushbutton for each high lift walking and differential feed instead of the KN16, the operating mode stored or not stored is set to the respective pushbutton by parameter F-191.

The operating mode stored can only be set to one of the two functions.

- F-192 = off, high lift walking + differential feed
- operating mode not stored
- F-192 = on + F-191 = off, differential feed
- operating mode stored
high lift walking
- operating mode not stored
- F-192 = on + F-191 = on, high lift walking
- operating mode stored
differential feed
- operating mode not stored

7.26.3 KN16 and Separate Pushbuttons Connected At The Same Time

If KN16 and the separate pushbuttons are connected at the same time only the function set to the knce switch can be programmed and/or switched with operating mode stored.
The operating mode of the other function is always not stored.

Direct access by function key (pushbutton 3)

Funktions	Abbreviation on the display	Parameter
Function operating mode stored/not stored	-F-	F-008 = 5

7.27 Speed Limitation Depending on High Lift

Functions	Abbreviation on the display	Parameter
Maximum speed	n2	F-111
High lift walking speed	n10	F-117
Speed setting depending on high lift	knP	F-182

The maximum speed can be limited depending on the set high lift of the presser foot.
21 high lift levels can be sensed by the analog output "high lift".

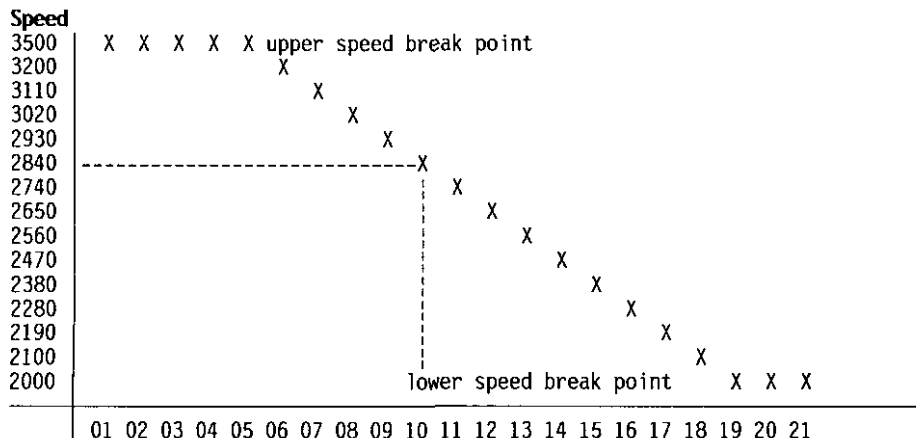
- The setting of the speed limitation to the 21 high lift levels can be programmed
- Minimum high lift = maximum speed (n2)
- Maximum high lift = minimum speed (n10)

Display example parameter F-182:

05 10 19
2840

- Signification:**
- 05 -> upper speed break point n_{max} (minimum high lift walking)
= high lift walking stage where maximum speed is reached
 - 10 -> set stage
 - 19 -> lower speed break point n_{hp} (maximum high lift walking)
= high lift walking stage where minimum speed is reached
 - 2840 -> speed resulting from set high lift level

The above example shows the following graduation:



Programming:

- Determine maximum speed with F-111
- Determine high lift walking speed with F-117
- Recall F-182, enter with pushbutton E == >

XX AB YY
ZZZZ

 - XX= lower break point
 - YY= upper break point
 - AB= corresponding stage
 - ZZZZ= speed
- Set high lift walking to the stage up to which full speed shall be maintained (upper break point)
- Enter with pushbutton E == > value of AB is taken over to XX
- Set high lift walking to the stage from which the minimum high lift walking speed shall be effective (lower break point)
- Enter with pushbutton E == > new value of AB is taken over to YY
- Exit programming with pushbutton P

Note:

If the functions "speed limitation depending on high lift and on stitch length" are used at the same time the maximum speed is limited to the respective lower set value of high lift and stitch length.

7.28 Speed Limitation Depending on Stitch Length

Functions	Abbreviation on the display	Parameter
Maximum speed	n2	F-111
Minimum speed depending on stitch length	n15	F-195

The maximum speed can be limited depending on the set stitch length.
The setting of the stitch length is registered by a sensor unit as 4-bit-code (0-15).

- Minimum stitch length = maximum speed
- Maximum stitch length = minimum speed

Stages	Sensor4	Sensor3	Sensor2	Sensor1	Remarks
0	0	0	0	0	n2 F-111
1	0	0	0	1	
2	0	0	1	0	
3	0	0	1	1	
4	0	1	0	0	
5	0	1	0	1	
6	0	1	1	0	
7	0	1	1	1	
8	1	0	0	0	
9	1	0	0	1	
10	1	0	1	0	
11	1	0	1	1	
12	1	1	0	0	
13	1	1	0	1	
14	1	1	1	0	
15	1	1	1	1	n15 F-195

0 = Sensor open (non-attenuated); 1 = Sensor closed (attenuated)

Note:

If the functions "speed limitation depending on high lift and on stitch length" are used at the same time the maximum speed is limited to the respective lower set value of high lift and stitch length.

7.29 Signal Output POS1

- Transistor output with open collector
- Switches whenever the needle is in the slot between position 1 and 1A
- Independent of sewing, thus also when turning the handwheel manually
- Suitable e.g. for the connection of a counter

7.30 Signal Output G1

- Transistor output with open collector
- Switches whenever a slot on the impulse track of the position transmitter disc is sensed (512 times per rotation)
- Independent of sewing, thus also when turning the handwheel manually
- Suitable e.g. for the connection of a counter

7.31 External Actuator EB301 and EB302

With the help of the external actuator connected with the pedal the commands for the sewing operation are inputted.

Instead of the external actuator connected to the socket connector B80 (table 2) another external actuator can be connected.

The external actuator EB302 has softer springs than EB301. This means that a lower actuating force is needed.

Table: Coding of the pedal stages

Pedal stage	D	C	B	A		
-2	H	H	L	L	Full heelback	(e.g. initiating the seam end)
-1	H	H	H	L	Slight heelback	(e.g. presser foot lifting)
0	H	H	H	H	Pedal in position 0 (neutral)	
$\frac{1}{2}$	H	H	L	H	Pedal slightly forward	(e.g. presser foot lowering)
1	H	L	L	H	Speed stage 1	(n_{pos})
2	H	L	L	L	.	
3	H	L	H	L	.	
4	H	L	H	H	.	
5	L	L	H	H	.	
6	L	L	H	L	.	
7	L	L	L	L	.	
8	L	L	L	H	.	
9	L	H	L	H	.	
10	L	H	L	L	.	
11	L	H	H	L	.	
12	L	H	H	H	Speed stage 12 (Pedal fully forward)	(n_{max})

Functions	Abbreviation on the display	Parameter
Speed stage distribution	nSt	F-119

The characteristic curves of the pedal (speed change from stage to stage) can be adjusted.

Possible characteristic curves:

- linear
- progressive
- highly progressive

8. Machine Functions

8.1 Braking Behavior

Functions	Abbreviation on the display	Parameter
Speed reduction < 400 min ⁻¹	br1	F-207
Speed reduction > 400 min ⁻¹	br2	F-208

The braking effect of the drive can be adjusted.

The following applies to all adjustment values:

The higher the value the more aggressive the braking reaction!

8.2 Braking Power at Standstill

Functions	Abbreviation on the display	Parameter
Braking power at standstill	brt	F-153

This function prevents unintentional "wandering" of the needle at standstill.

The effect can be tested by turning the handwheel.

- The braking power works at standstill
 - at stop in the seam
 - after trimming
- The effect is adjustable
- The higher the set value, the higher the braking power
- It does not work after power on, unless sewing has not been started

8.3 Start Behavior

Functions	Abbreviation on the display	Parameter
Starting edge	ALF	F-220

The drive accelerating dynamics can be adapted to the characteristic of the sewing machine (light, heavy).

- High setting = high acceleration

With a high starting edge setting and, in addition, possibly high braking parameter values on a light machine, the behavior may appear coarse. In this case, one should try to optimize the settings.

Incorrect setting can cause the drive to lock or not to reach the set speed. In this case, the drive stops and the display shows an error message.

8.4 Setting the Positions

Functions	Abbreviation on the display	Parameter
Setting the reference position (position 0) (neutral)	Sr1	F-170
Setting the signal and stop positions	SR2	F-171
Display of the signal and stop positions	SR3	F-172

8.4.1 Reference Position

The angular positions necessary on the machine, e.g. for needle down position or thread lever up position are stored in the control as numerical or angular values.

In order to establish a relationship between the electric position transmitter information and actual mechanical position a reference position is needed.

POSITION 0

The reference position must be set:

- for initial operation
- after changing the position transmitter
- after changing the EPROM or the microprocessor

Reference position = Needle point at the height of the needle plate, from downward movement of the needle in the direction of rotation of the motor shaft.

Note:

If another needle position (other than reference position) is adjusted the values of the signal and stop positions (pos 1 and pos 2) preset by the manufacturer are no longer valid and **must** be reset.

Programming:

- 1.) Address F-170. ==> LED pushbutton 3 blinks
- 2.) Press pushbutton 3 briefly ==>

PoSition
 0]
- 3.) Turn handwheel until desired reference position is reached
Note: Turn at least until marker (]) has disappeared
- 4.) Press pushbutton E ==> Position 0 (neutral) is read by the control

If the reference position was not stored there will be an error message on the display:

INFO A3

- Repeat operation from step 3 onwards

8.4.2 Signal and Stop Positions

Functions	Display
Position 1 (lower needle position, switch-on position of the thread trimmer)	Pos1
Position 2 (switch-on position of the thread tension release)	Pos2
Position 1A (switch-off position of the thread trimmer)	Pos1A
Position 2A (stop position after thread trimming)	Pos2A
Position 3	Pos3
Position 3A	Pos3A

Programming:

1. Address F-171 ==> LED pushbutton 3 blinks!
2. Press pushbutton 3 ==>

Position 1 xxx

 Value xxx can be modified by pushbutton +/- or by turning the handwheel!
Set position 1
3. Press pushbutton E ==>

Position 1A xxx

Set position 1A
4. Press pushbutton E ==>

Position 2 xxx

Set position 2
5. Press pushbutton E ==>

Position 2A xxx

Set position 2A
6. Press pushbutton E ==>

Position 3 000

Position does not have to be set !
7. Press pushbutton E ==>

Position 3A 000

Position does not have to be adjusted !
8. Press pushbutton E ==> Back to step 2!
9. Press pushbutton P ==> Positions will be read by the control

Note:

When adjusting the positions by the handwheel, make sure that the numerical value indicated on the display changes.

The setting values of the positions are programmed in the factory. After setting the reference position the machine is ready for use. The settings only need to be changed on non-standard machines and/or for fine tuning.

The display unit of the set positions is increments.

One rotation of the handwheel corresponds to 512 increments.

The change on the display is shown in increments of 2.

A change from one to the next value thus corresponds to approx. 1.4 angular degrees.

8.4.3 Display of the Signal and Stop Positions

The position settings can easily be tested by parameter F-172.

- Address parameter F-172
- Turn handwheel corresponding to the direction of rotation of the motor
 - LED pushbutton 1 on - corresponds to position 1
 - LED pushbutton 1 turns off - corresponds to position 1A
 - LED pushbutton 2 on - corresponds to position 2
 - LED pushbutton 2 turns off - corresponds to position 2A

Position 3, 3A and the reference position are not displayed.

9. Memory Box

Functions	Abbreviation on the display	Parameter
Language selection		F-178
Memory Box operation on/off	FMb	F-197
Memory Card formatting on/off	Foc	F-198

With the help of the Memory Box available as a special accessory it is possible to permanently store programs inputted on the Variocontrol with a Memory Card and to recall them whenever necessary.

This avoids having to reprogram for recurring sewing operations.

■ A maximum of 10 different programs (data records) can be stored, each with the total program contents of the control (see chapter Programming Scams - Teach-in)

9.1 Preparation for Memory Box Operation



Caution!
Turn power off

- Unplug Variocontrol from the control
- Plug Memory Box into control
- Plug Variocontrol into Memory Box
- Turn power on
- Activate Memory Box by parameter F-197

9.2 Formatting of the Memory Card

The Memory Card is the storage medium for the programs.

Before using each Memory Card for the first time it must be prepared for receiving data by "formatting".

Note:
Original EFKA Memory Cards, with EFKA label, have been formatted and tested in the factory.

- Insert Memory Card with the labelled side up into the slot of the Memory Box.
 - If the Memory Card is correctly inserted the green LED on the Memory Box lights up. If LED does not light up repeat operation or use different card.
- Switch parameter F-198 on.
- Press pushbutton -P or -E.
 - The display on the Variocontrol shows a growing series of lines from left to right. When the series reaches its full length, the formatting is finished.
 - The formatting can also be used to erase all data on the Memory Card.

9.3 Operating the Memory Box

1. » Insert Memory Card with the labelled side up into the slot of the Memory Box.
If the Memory Card is correctly inserted the green LED on the Memory Box lights up.
2. » Turn "Programming Seams (Teach-in)" off == > pushbutton 2
3. » Save data

Remark: All adjustable parameters and sewing data are stored with the exception of the direction of rotation and the needle positions.

- Push pedal twice in short intervals, after end of seam, and put back to position 0 (neutral) SAvE
0--9
- Input any address between 0 and 9 for the data record.
 - The yellow BUSY-LED on the Memory Box lights up.
 - In case a data record already exists under the selected reference number, it will be overwritten. SAvE
|||||
- Display after the storing is terminated 3500
JU82AV

4. » Reading data from the Memory Card into the control (2 possibilities)

Possibility no. 1:

- Push pedal forward (stage 12), then turn power on rEAd
0--9
- Input address under which the desired data record is stored.

Note:
For storing data permanently start sewing once before turning the power off!

Possibility no. 2:

- Push pedal twice in short intervals, after end of seam. SAvE
0--9
- Push pedal fully forward and put back to position 0 (neutral) rEAd
0--9
- Input address under which the desired data record is stored.
 - The yellow BUSY-LED on the Memory Box lights up. rEAd
|||||
- Display after saving the program 3500
JU82AV

Note:
For storing data permanently start sewing once before turning the power off!

5. » Operation without Variocontrol

- Writing and reading is done by pushing the pedal as described in step 3 and 4.
- Program 1 is always automatically selected.
- Reading-in is only possible if power is turned on with pedal fully forward.
- Alternating between writing and reading:
 - Pedal backward twice in short intervals = writing
 - Pedal fully forward and POWER ON = reading

6. » Exit

- **Interruption:**
 - Press one of the green pushbuttons (P E + -) on the Variocontrol
 - The Variocontrol display shows the values of normal operation
- **If data are not to be saved:**
 - Turn power off and on again
- **If data are to be saved:**
 - For storing data permanently start sewing once before turning the power off!

7. » Error messages

An error message is shown on the display, when the disturbances indicated below occur. The red LED on the Memory Box signals disturbances.

```

-----
InFo Cxx
  
```

"xx" stands for a number in the following table:

INFO-No.	Display
C01	Memory Card not inserted
C02	Memory Card cannot be written on
C03	Memory Card formatting
C04	Memory Card writing or reading error
C05	Connection interrupted
C06	Data are not found
C07	No more space for data

Language selection:

- A language can be selected by parameter F-178. All additional information is then shown in the corresponding language.

```

dEU  USA
ESP  FrA
  
```

10. Error Messages

General Information

Display	Signification
Info A1	Pedal not in neutral position, when switching the machine on
Info A3	The reference position (position 0) has not been stored
Info A4	Control panel not clearly selected

Programming of Functions and Values (Parameters)

Display	Signification
Info F1	Wrong code number or parameter number input

Serious Situation

Display	Signification
Info E1	Position transmitter not connected or defective
Info E2	Line voltage too low, or time between power off and power on too short
Info E3	Machine locks, or does not reach the desired speed
Info E4	Control disturbed by deficient grounding or loose contact

Hardware Disturbance

Display	Signification
Info H1	Commutation transmitter cord or frequency converter disturbed
Info H2	Processor disturbed

Memory Card Information

Display	Signification
Info C01	Memory Card not inserted
Info C02	Memory Card cannot be written on
Info C03	Memory Card formatting
Info C04	Memory Card writing or reading error
Info C05	Connection interrupted
Info C06	Cannot find data on Memory Card
Info C07	Storage space on Memory Card occupied

11. Signal Test

Functions	Abbreviation on the display	Parameter
Test of inputs and outputs	SR4	F-173

Output tests:

- Function test of the transistor power outputs and actuators connected to them (e.g. solenoids and solenoid valves)
- Test is initiated by pressing pushbuttons 0...9 on the Variocontrol.

Table: Allocation of the pushbuttons for the outputs

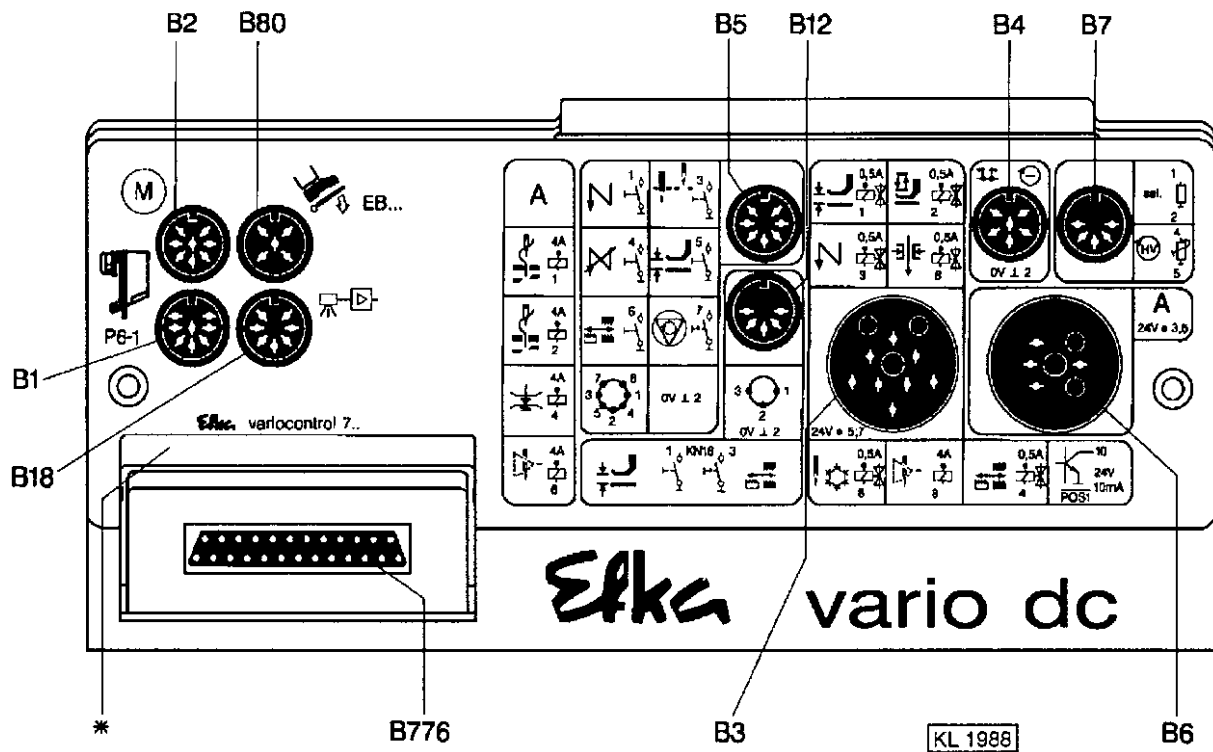
Pushbutton	Output
1	Backtacking
2	Presser foot lifting
3	High lift walking
4	Differential feed
5	Needle cooling
6	Thread trimmer 1
7	Thread wiper
8	Thread tension release
9	Thread trimmer 2
0	Thread clamp

Input tests:

- Actuation of the external switches or pushbuttons will be indicated by alternating the switching state (on/off) on the display.
- Several switches must not be closed at the same time.

12. Socket Connectors

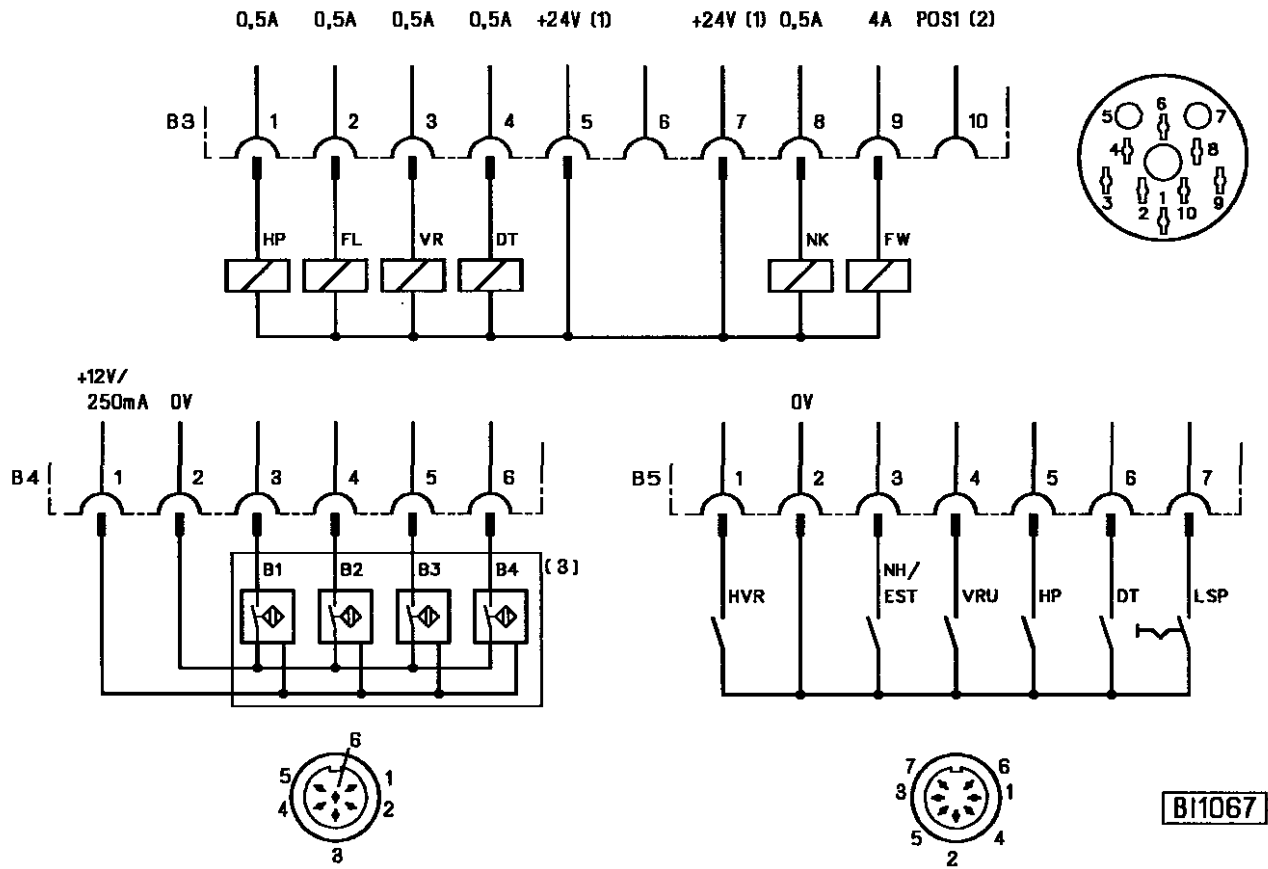
12.1 Position in the Control



- B1 - Position transmitter
- B2 - Commutation transmitter for DC motor
- B3 - Machine
- B4 - Stitch length sensor
- B5 - Switches and pushbuttons
- B6 - Solenoids/solenoid valves
- B7 - Machine
- B12 - Knee switch KN16
- B18 - Light barrier module
- B80 - External actuator
- B776 - Control panel Variocontrol

* = Type designation

12.2 Connection Diagram



Outputs

- DT - Differential feed
- FL - Presser foot lifting
- HP - High lift walking
- NK - Needle cooling
- VR - Backtacking
- FW - Thread wiper
- 512 Impulse - Signal output 512 impulses/rotation

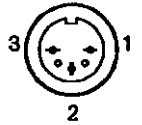
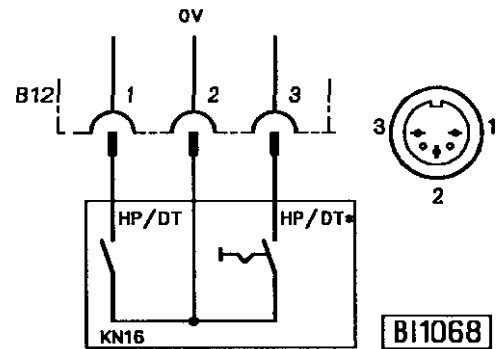
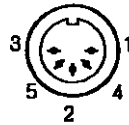
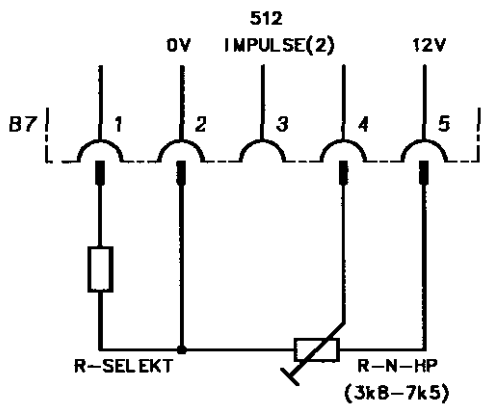
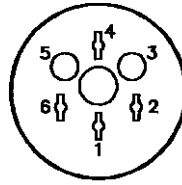
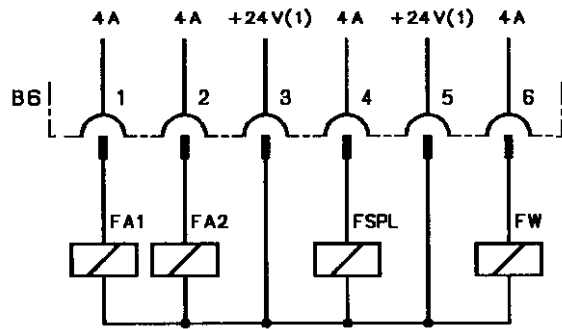
Inputs

- DT - Differential feed
- HP - High lift limitation
- HVR - Intermediate backtack
- LSP - Blocking of machine run
- NH/EST - Needle up/single stitch
- VRU - Backtack suppression

Other

- B1 - Sensor (lowest bit)
- B2 - Sensor
- B3 - Sensor
- B4 - Sensor (highest bit)

1) Nominal voltage 24V, no-load voltage max. 36V
 2) Transistor output with open collector (max. 40V, 10mA)
 3) Sensor unit for speed adjustment depending on stitch length



FA1 = FA2 - Thread trimmer
 FW - Thread wiper
 FSPL - Thread tension release

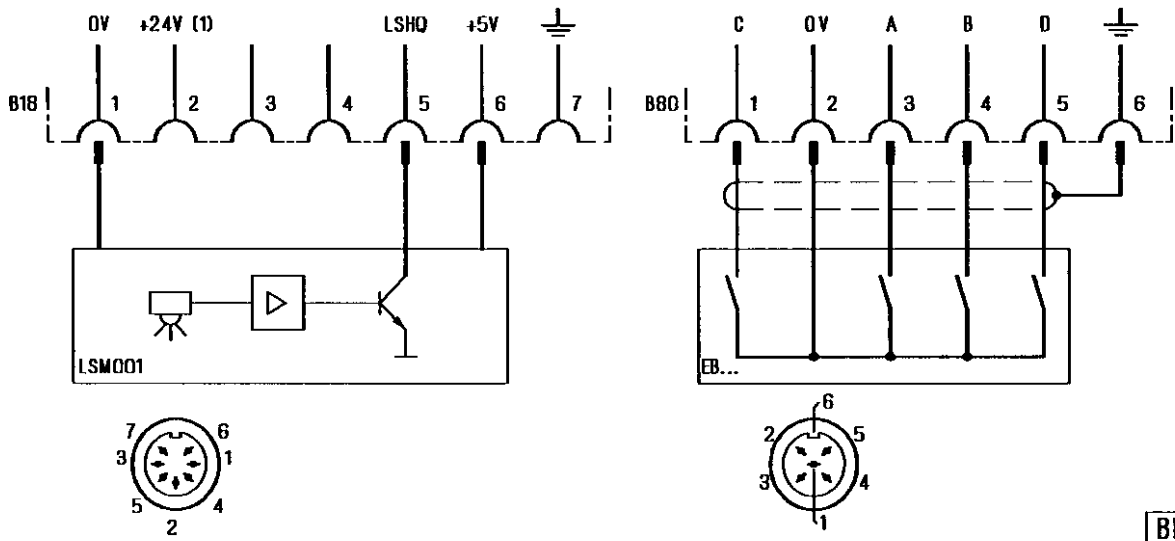
R-N-HP - Actual value transmitter for high lift
 R-SELEKT - Resistor for machine select

HP/DT - Pushbutton high lift walking/differential feed in the KN16
 HP/DT* - Commutator high lift walking/differential feed operating mode stored/not stored in the KN16

512 Impulse - Signal output 512 impulses/rotation

1) Nominal voltage 24V, no-load voltage max. 36V

2) Transistor output with open collector (max. 40V, 10mA)



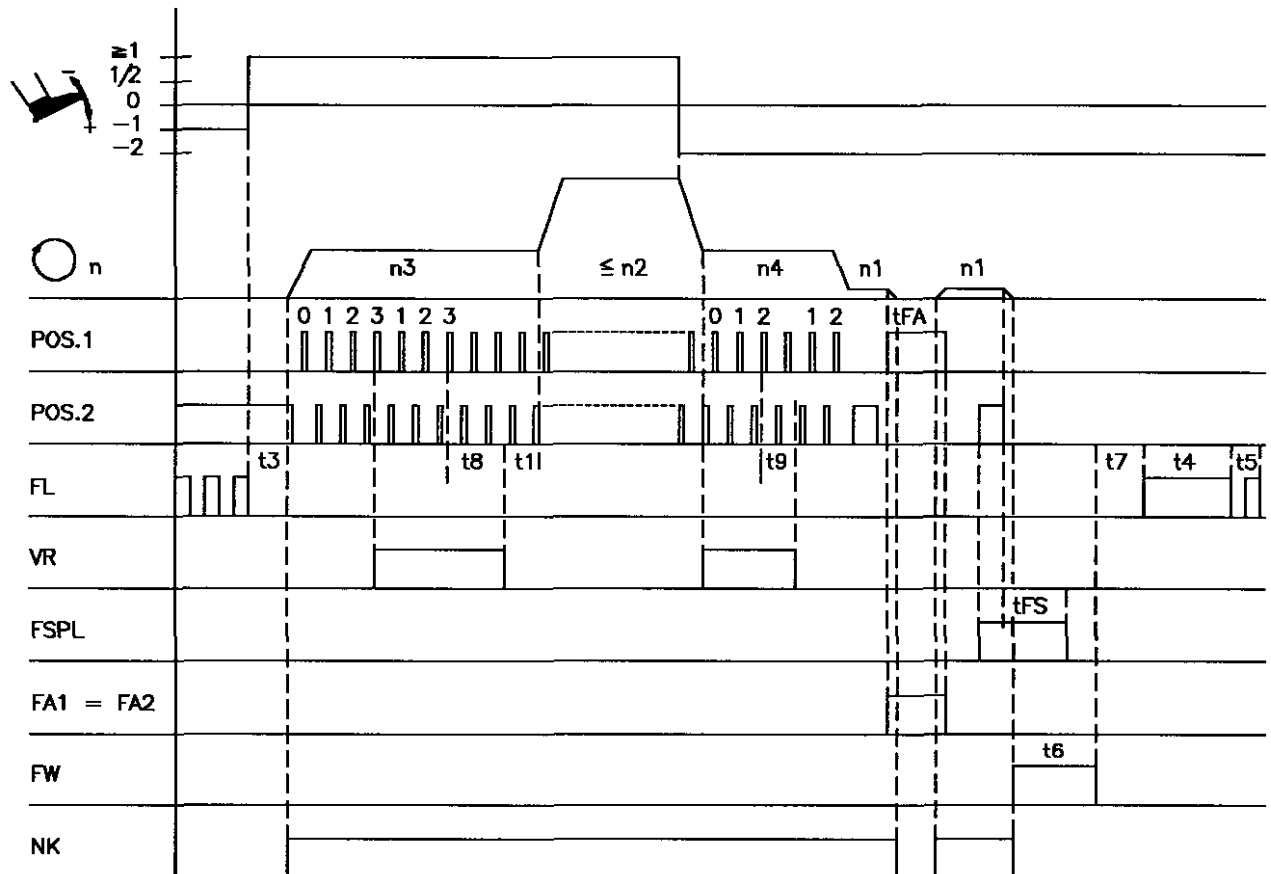
B11027 a

- LSHQ - Light barrier command (identified when switched to 0V)
- LSM001 - Reflection light barrier module
- EB... - External actuator

2) Nominal voltage 24V, no-load voltage max. 36V

13. Function Diagrams

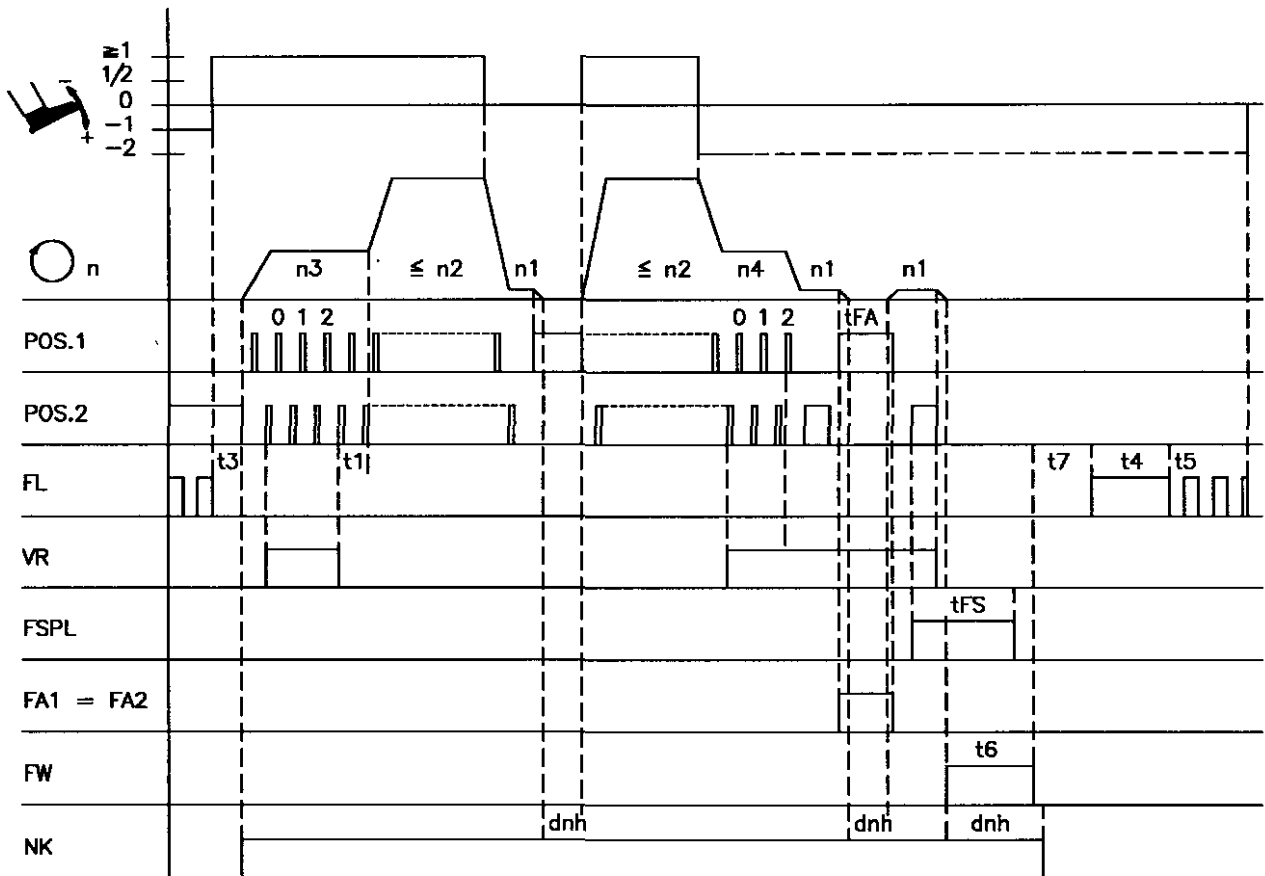
Trimming from full run



0209/FALAUF

Abbreviation	Function	Parameter/Pushbutton
	Double start backtack Double end backtack	on on Pushbutton 7 Pushbutton 8
n2 n3 n4 n7	Maximum speed Start backtack speed End backtack speed Trimming speed	F-111 F-112 F-113 F-116
t1 t3 t4 t5 t6 t7 t8 t9 tFA tFS Syn	Delay of speed release after start backtack Start delay from lifted foot Full power of presser foot lifting Presser foot lift pulsing Thread wiper time Delay time thread wiper off until presser foot lifting on Start backtack stitch correction End backtack stitch correction Stop time for thread trimmer Switch-off delay of thread tension after thread trimming Synchronization end backtack to position 2	F-200 F-202 F-203 F-204 F-205 F-206 F-150 F-151 F-290 F-291 F-283 = 2

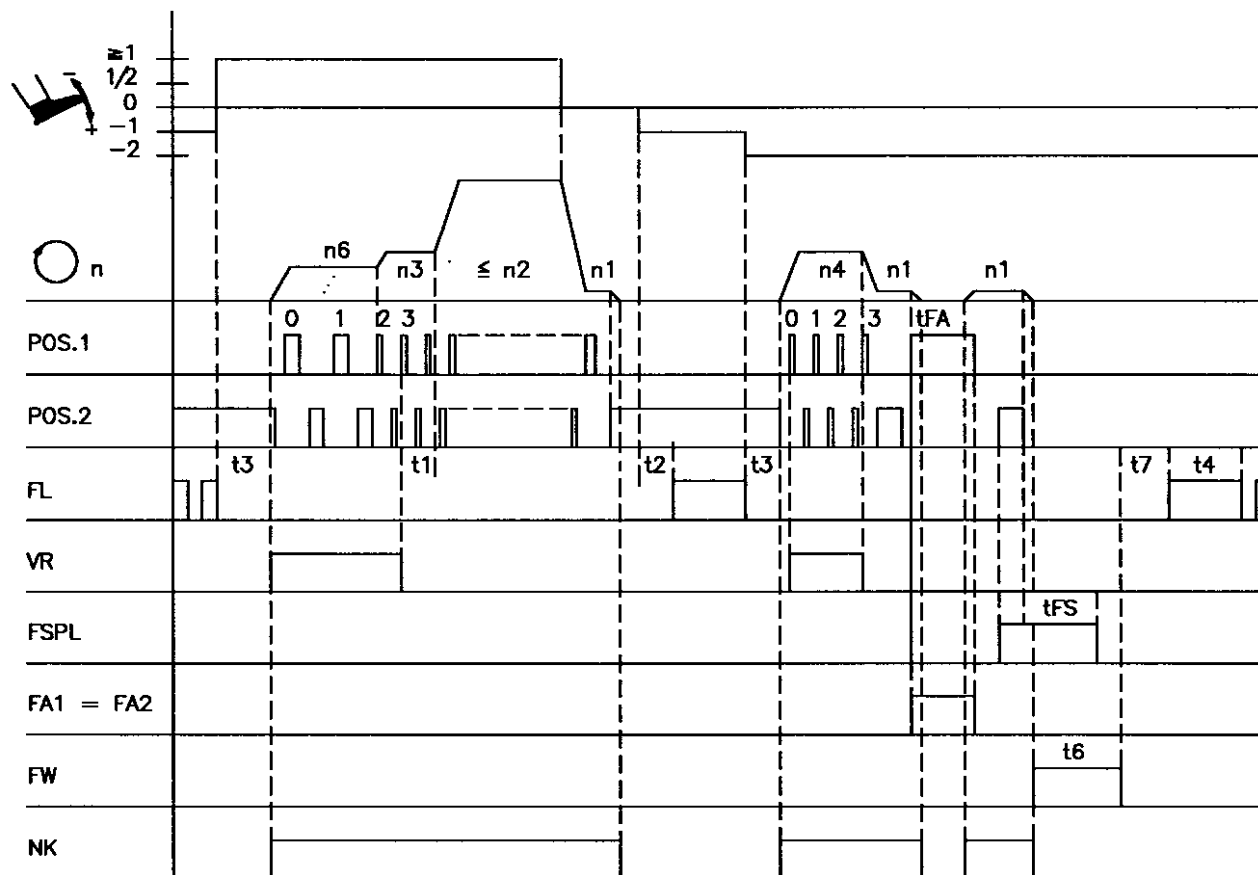
Run with intermediate stop



0209/LAUFZW

Abbreviation	Function	Parameter/Pushbutton
	Single start backtack Single end backtack Basic position 2	on on on Pushbutton 7 Pushbutton 8 Pushbutton 4
n1	Positioning speed	F-110
n2	Maximum speed	F-111
n3	Start backtack speed	F-112
n4	End backtack speed	F-113
t1	Delay of speed release after start backtack	F-200
t3	Start delay from lifted foot	F-202
t4	Full power of presser foot lifting	F-203
t5	Presser foot lift pulsing	F-204
t6	Thread wiper time	F-205
t7	Delay time thread wiper off until presser foot lifting on	F-206
tFA	Stop time for thread trimmer	F-290
tFS	Switch-off delay of thread tension after thread trimming	F-291
dnh	Prolongation needle cooling after stop	F-184
Syn	Synchronization start and end backtack to position 2	F-283 = 4

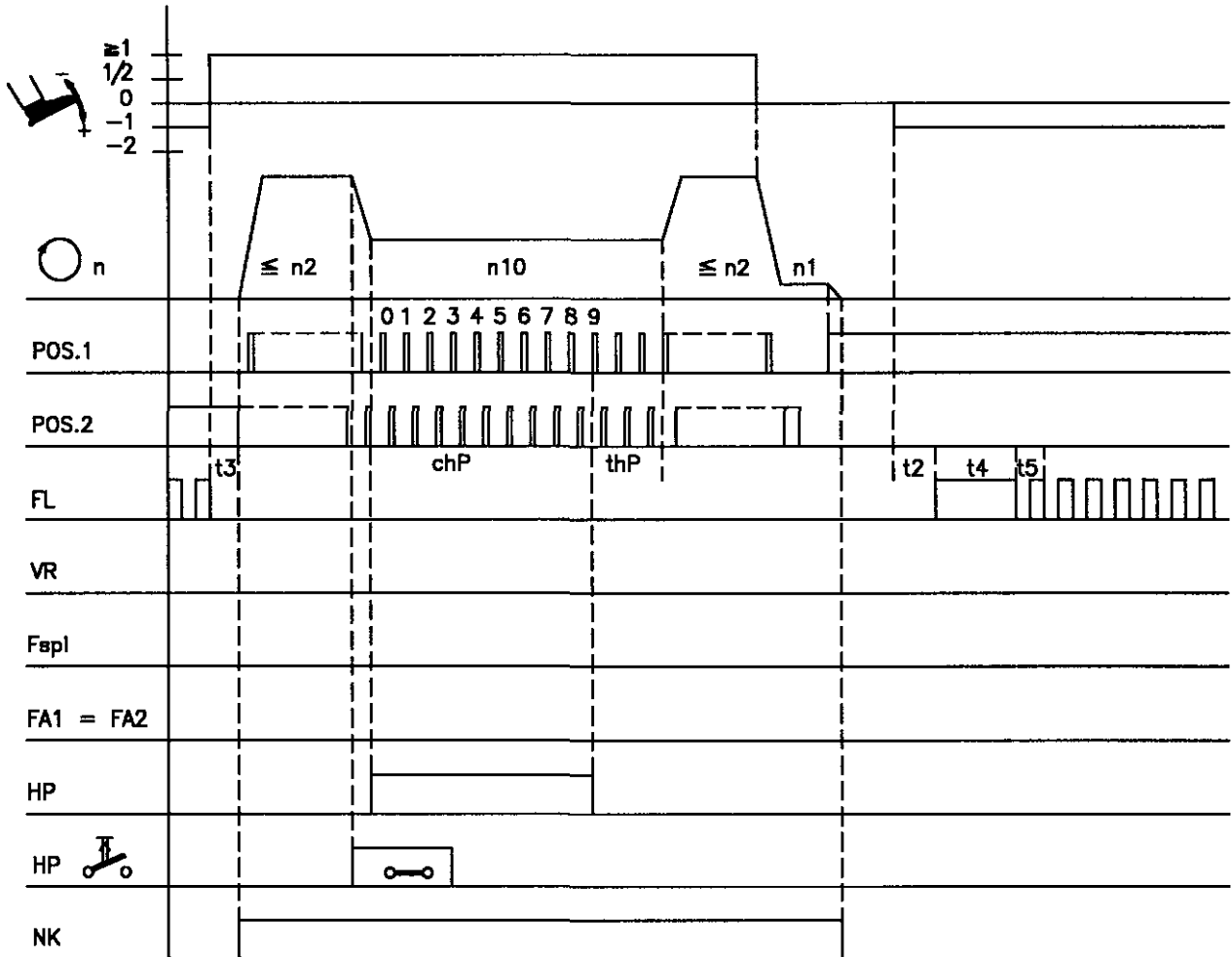
Trimming from intermediate stop



0209/FAZW

Abbreviation	Function	Parameter/Pushbutton
	Softstart Single start backtack Single end backtack Basic position 2	on F-134 on Pushbutton 7 on Pushbutton 8 on Pushbutton 4
n1	Positioning speed	F-110
n2	Maximum speed	F-111
n3	Start backtack speed	F-112
n4	End backtack speed	F-113
n6	Softstart speed	F-115
t1	Delay of speed release after start backtack	F-200
t2	Delay of presser foot lifting with pedal in position -1	F-201
t3	Start delay from lifted foot	F-202
t4	Full power of presser foot lifting	F-203
t5	Presser foot lift pulsing	F-204
t6	Thread wiper time	F-205
t7	Delay time thread wiper off until presser foot lifting on	F-206
tFA	Stop time for thread trimmer	F-290
tFS	Switch-off delay of thread tension after thread trimming	F-291
Syn	Synchronization end backtack to position 1	F-283 = 1

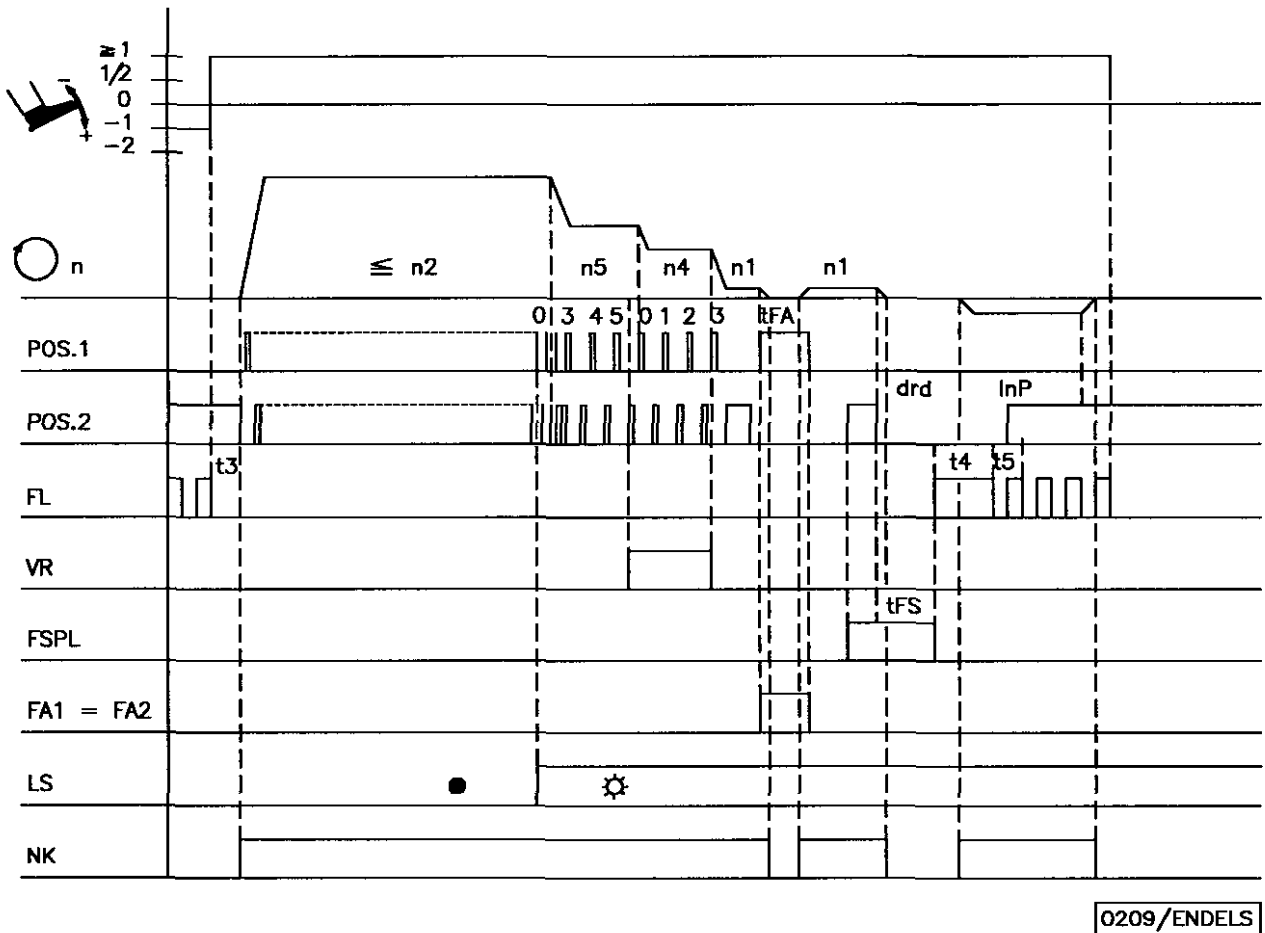
Machine run with high lift walking



0209/LAUFHUB

Abbreviation	Function	Parameter/Pushbutton
	High lift walking counting Start backtack End backtack	on F-187 off Pushbutton 7 off Pushbutton 8
n1 n2 n10	Positioning speed Maximum speed High lift walking speed	F-110 F-111 F-117
t2	Delay of presser foot lifting with pedal in position -1	F-201
t3	Start delay from lifted foot	F-202
t4	Full power of presser foot lifting	F-203
t5	Presser foot lift pulsing	F-204
thP	Run-out time of high lift walking speed	F-152
chP	Number of stitches high lift walking	F-185

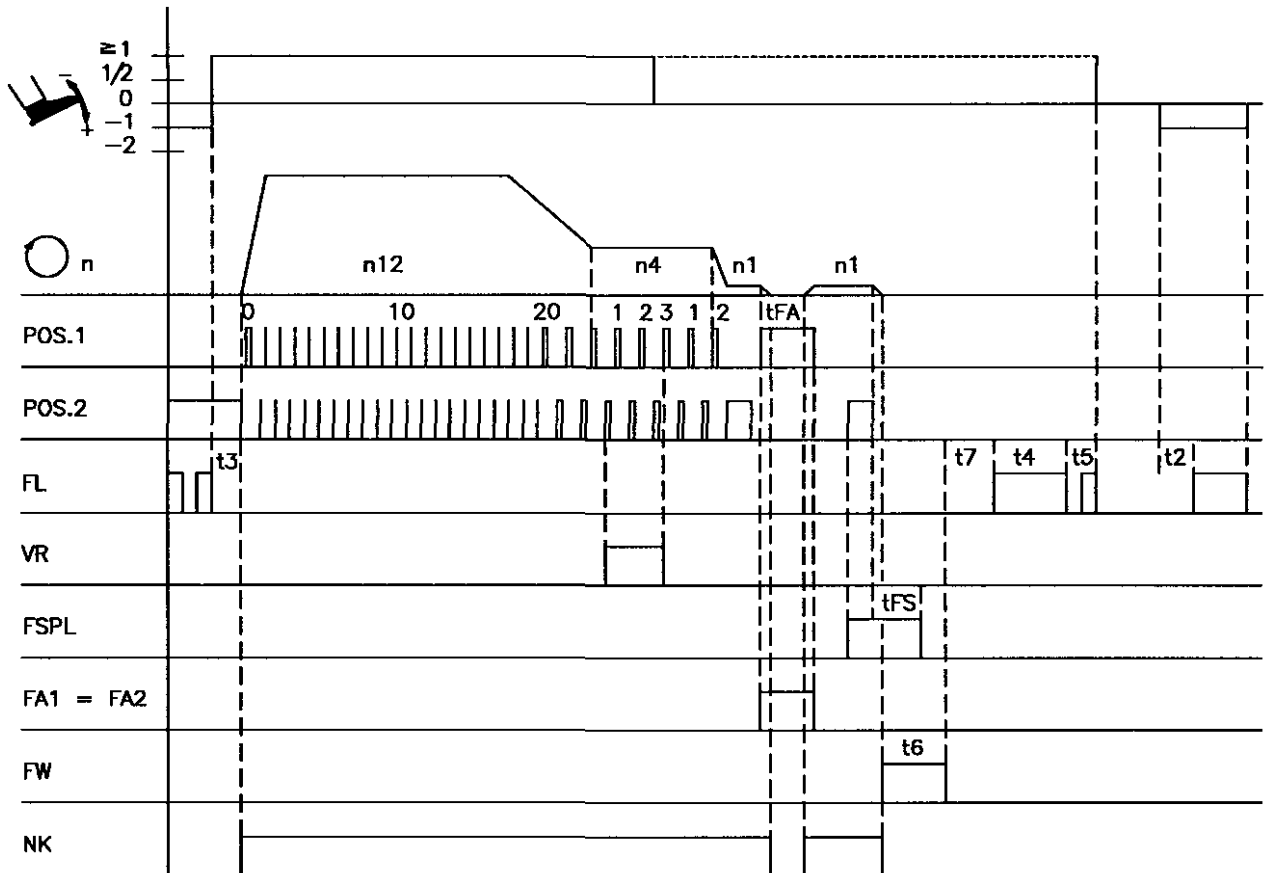
Seam end by light barrier



0209/ENDELS

Abbreviation	Function	Parameter/Pushbutton
	Start backtack	off
	Single end backtack	on
	Reversion	on
	Light barrier	on
	Light barrier covered/uncovered	on
n1	Positioning speed	F-110
n2	Maximum speed	F-111
n4	End backtack speed	F-113
n5	Speed after light barrier sensing	F-010
t3	Start delay from lifted foot	F-202
t4	Full power of presser foot lifting	F-203
t5	Presser foot lift pulsing	F-204
t6	Thread wiper time	F-205
t7	Delay time thread wiper off until presser foot lifting on	F-206
tFA	Stop time for thread trimmer	F-290
tFS	Switch-off delay of thread tension after thread trimming	F-291
drd	Delay of reversion	fixed
InP	Increments of reversion	F-183
Syn	Synchronization end backtack to position 2	F-283 = 2

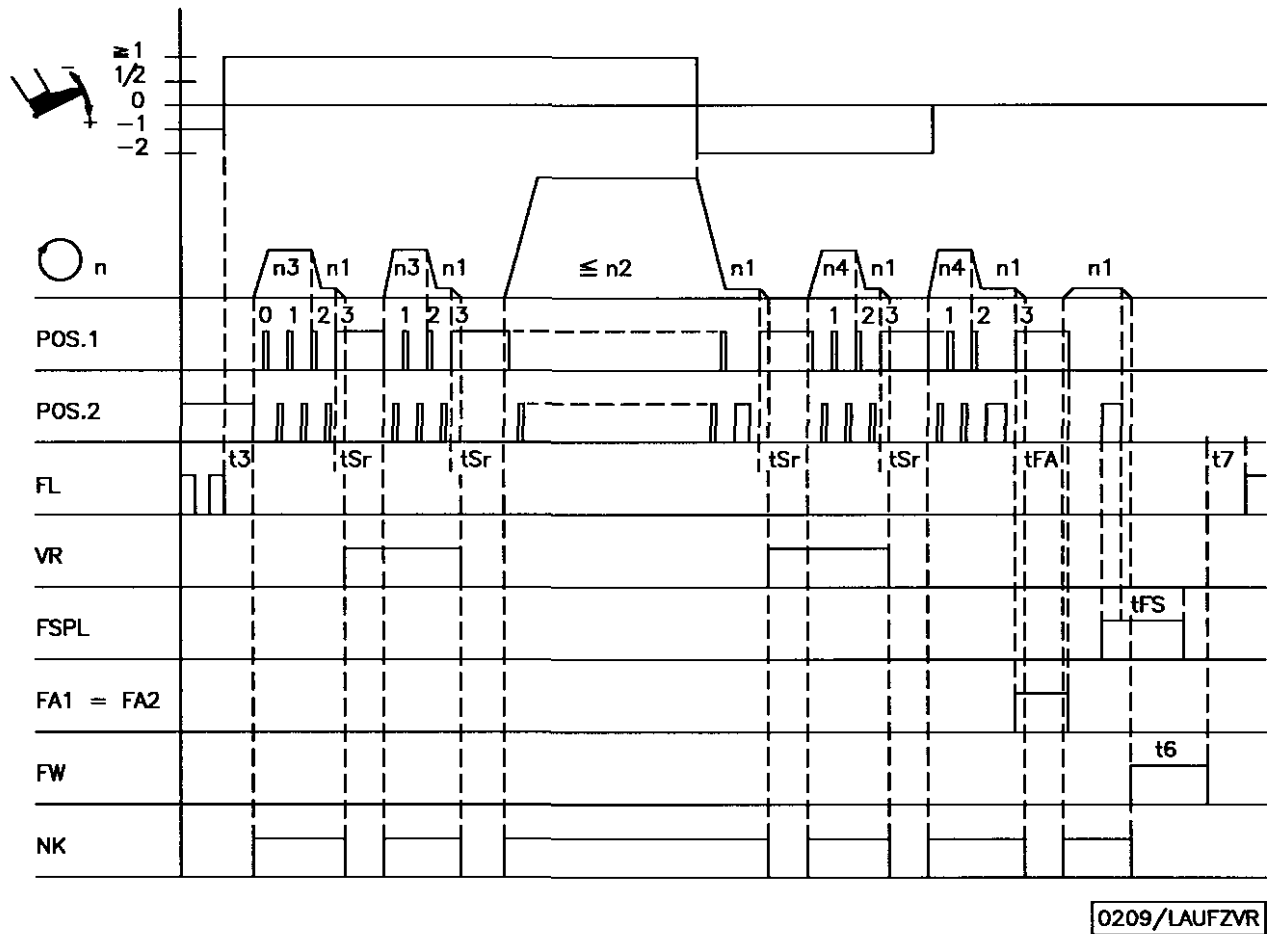
Seam end by stitch counting



0209/ENDEZAE

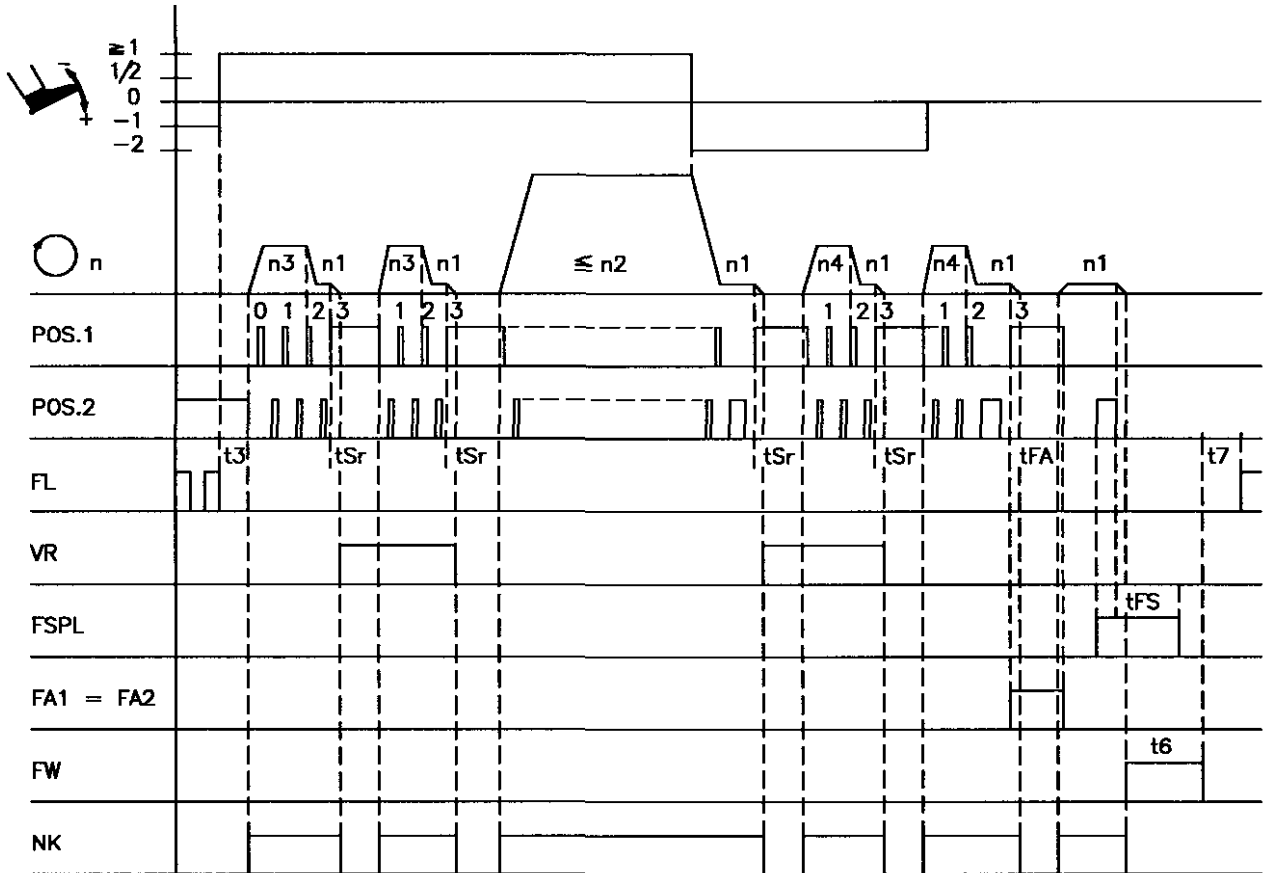
Abbreviation	Function	Parameter/Pushbutton
	Start backtack Double end backtack Stitch counting	off on on Pushbutton 7 Pushbutton 8 Pushbutton 1
n4 n7 n12	End backtack speed Trimming speed Stitch counting speed	F-113 F-116 F-011
t2 t3 t4 t5 t6 t7 tFA tFS Syn	Delay of presser foot lifting with pedal in position -1/-2 Start delay from lifted foot Full power of presser foot lifting Presser foot lift pulsing Thread wiper time Delay time thread wiper off until presser foot lifting on Stop time for thread trimmer Switch-off delay of thread tension after thread trimming Synchronization end backtack to position 2	F-201 F-202 F-203 F-204 F-205 F-206 F-290 F-291 F-283 = 2

Run with ornamental backtack



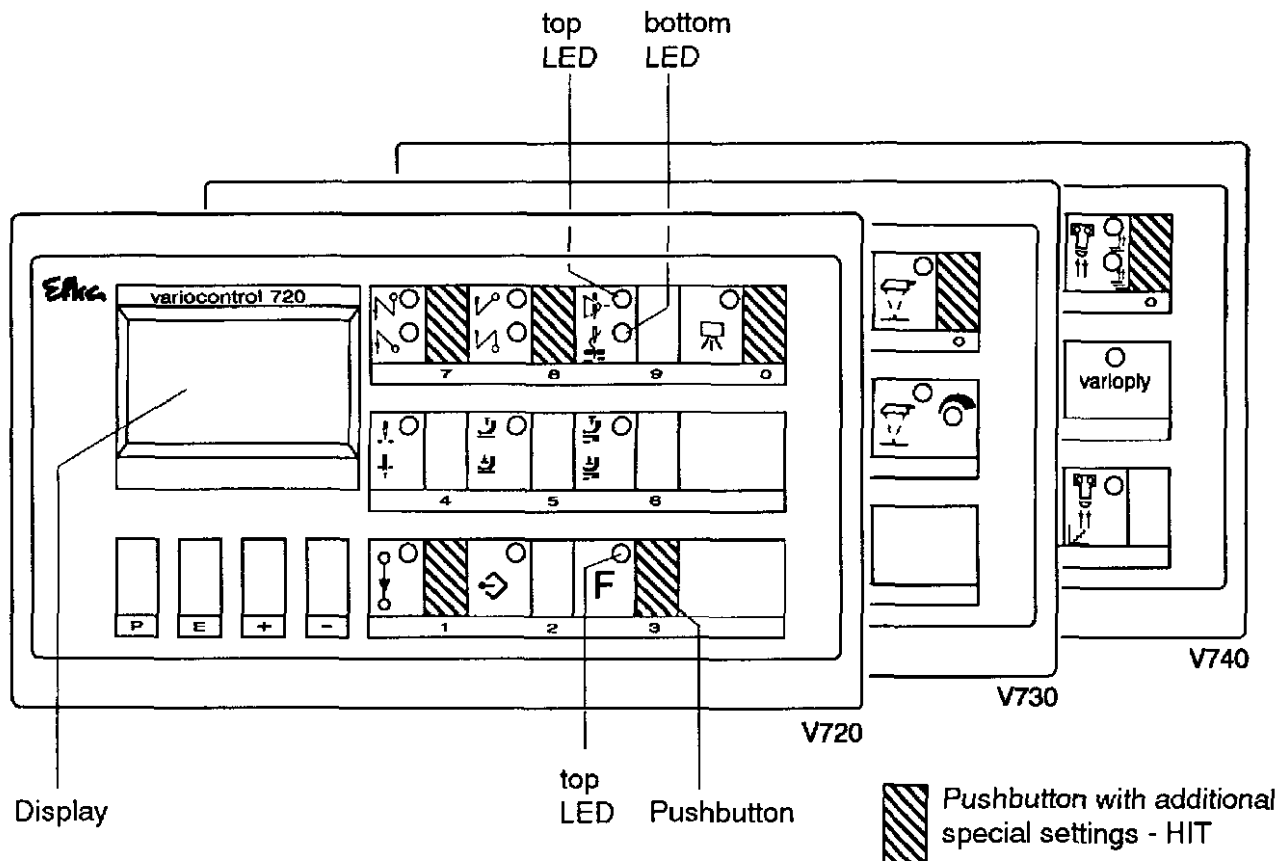
Abbreviation	Function	Parameter/Pushbutton
	Ornamental backtack Presser foot lifting saved after trimming	on on F-135 Pushbutton 6
n1 n2 n3 n4	Positioning speed Maximum speed Start backtack speed End backtack speed	F-110 F-111 F-112 F-113
t3 t4 t5 t6 t7 tSr tFA tFS	Start delay from lifted foot Full power of presser foot lifting Presser foot lift pulsing Thread wiper time Delay time thread wiper off until presser foot lifting on Stop time for ornamental backtack Stop time for thread trimmer Switch-off delay of thread tension after thread trimming	F-202 F-203 F-204 F-205 F-206 F-210 F-290 F-291

Short run with ornamental backtack



0209/LAUFZVR

Abbreviation	Function	Parameter/Pushbutton
	Ornamental backtack Presser foot lifting saved after trimming Presser foot lifting saved during intermediate stop	on on on F-135 Pushbutton 6 Pushbutton 5
n1 n3 n4	Positioning speed Start backtack speed End backtack speed	F-110 F-112 F-113
t3 t4 t5 t6 t7 tSr tFA tFS	Start delay from lifted foot Full power of presser foot lifting Presser foot lift pulsing Thread wiper time Delay time thread wiper off until presser foot lifting on Stop time for ornamental backtack Stop time for thread trimmer Switch-off delay of thread tension after thread trimming	F-202 F-203 F-204 F-205 F-206 F-210 F-290 F-291



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Functional Setting of the Pushbuttons

- Pushbutton P = Recall or exit of programming mode
- Pushbutton E = Enter button for modifications in the programming mode
- Pushbutton + = Increase of the value indicated in the programming mode
- Pushbutton - = Decrease of the value indicated in the programming mode
- Pushbutton 1 = Stitch counting ON / OFF
- Pushbutton 2 = Teach-in / execution of 40 possible seam sections
- Pushbutton 3 = Function key - can be programmed
- Pushbutton 4 = Basic position of the needle (bottom/upper dead center) = reverse position, if reversion is ON
POSITION 1 / POSITION 2
- Pushbutton 5 = Automatic foot lift at stop in the seam ON / OFF
- Pushbutton 6 = Automatic foot lift after thread trimming ON / OFF
- Pushbutton 7 = Start backtack SINGLE / DOUBLE / OFF
- Pushbutton 8 = End backtack SINGLE / DOUBLE / OFF
- Pushbutton 9 = THREAD TRIMMER / THREAD TRIMMER + THREAD WIPER / OFF
- Pushbutton 0 = Light barrier function:
V720/V730: ON / OFF
V740: EDGE SENSING / FABRIC PLY SENSING/OFF
- Pushbutton L = Sensitivity adjustment for fabric ply sensing (see chapter "Light Barrier")

Special Setting of the Pushbuttons for HIT

- Pushbutton P = Recall or exit of programming mode
- Pushbutton E = Enter button for modifications in the programming mode
- Pushbutton + = Increase of the value indicated in the programming mode
- Pushbutton - = Decrease of the value indicated in the programming mode
- Pushbutton 1 = Stitch counting ON / OFF
- Pushbutton 3 = Function key - can be programmed
- Pushbutton 7 = Start backtack SINGLE / DOUBLE / OFF
- Pushbutton 8 = End backtack SINGLE / DOUBLE / OFF
- Pushbutton 0 = Light barrier function:
V720/V730: ON / OFF
V740: EDGE SENSING / FABRIC PLY SENSING/OFF

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